SECOND SERIES VOL. IV, No. 11

BULLETIN

OF

THE NEW YORK ACADEMY OF MEDICINE

NOVEMBER, 1928

INSTITUTED 1847

PUBLISHED MONTHLY BY
THE NEW YORK ACADEMY OF MEDICINE
Fifth Avenue and 103rd Street
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Entered as second-class matter, February 3, 1928, at the postoffice at New York, N. Y., under the Act of August 24, 1912.

Subscription $2.00 per year. Single copies, 25 cents.

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BULLETIN OF
THE NEW YORK
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VOL. IV NOVEMBER, 1928 No. 11

ANNUAL GRADUATE FORTNIGHT

The Problem of Aging and of Old Age

INTRODUCTORY REMARKS [1]

SAMUEL W. LAMBERT, President

On behalf of Trustees and Officers of the Academy, I take pleasure in extending a welcome to all visitors and invited guests to the exercises which have been planned for the next two weeks. On their behalf I offer you the hospitality of our building and extend to you the facilities of our library. I would call to your attention especially the exhibition of books on old age which are grouped together in the library.

This Academy started as a local institution to further mutual conferences between the members of the profession and to support a medical library. It has appreciated for some years past that it has much more than that to do and that it has a duty to the public as well, in relation to questions of public health and sanitation and to the general profession of the country in regard to medical education. These duties have been delegated to two committees, one on Medical Education and one on Public Health Relations which have carried on for some time the work of the Academy on these lines.

These conferences on old age have been grouped under the heading of a Graduate Fortnight by the Committee on

[1] Delivered October 1, 1928.

Medical Education. It is expected if it be a success to make the same an annual event and to select each year some subject of general interest to practitioners and specialists alike for discussion by the best experts that the Academy can gather from any part of the medical world.

It is an experiment in graduate medical service and we have attempted it without previous experience. We trust that all our guests will be lenient if at some clinics and at some conferences the rooms are overfilled. We have issued no tickets and adopted no complicated machinery to control attendance, expecting that the divergence of interests would scatter our audiences among the many clinics to be given coincidently at various hospitals and schools. I must ask for your indulgence if our plan should not offer as comfortable and smooth an arrangement as we could wish for.

I take this opportunity to thank the different speakers, many of whom have come longer or shorter distances to participate in our Fortnight, to express an appreciation of the endeavor of the hospitals and medical schools and their professional staffs to co-operate in lectures, demonstrations and clinics and to the committee on arrangements, and Dr. Williams, our Director, and Dr. Reynolds, our Secretary, for their enthusiasm in undertaking the extra work involved.

We have selected for this year's subject "The Problem of Aging and the Diseases of Old Age." It is hoped that we may learn from this symposium, the better to appreciate the distinction between the old age that is inevitable and the pathology of the elder individual which can be postponed or avoided altogether, and I hope we shall all feel the younger as a result of our Fortnight's deliberations which should teach us that there are many troubles from which we do not suffer.

THE DOCTOR—TRAINER OR HEALER[1]

(ABSTRACT)

GEORGE E. VINCENT

President of the Rockefeller Foundation

It is fitting that an aging if not venerable layman should have a part in a symposium on what doctors know about old people and on what can be done to help them grow older more contentedly. His ignorance should prove both instructive and diverting, his fears significant, his desires suggestive even if pathetic. His demands upon the medical profession should at least be heard.

Of the making of new "ologies" there seems to be no end. One fears to see the morning paper lest another has been invented over night. Think of the terminations—too many of them fatal—in "itis" which the doctors have devised in recent years! And now comes the latest, gerontology, the science of old age. One enters a plea for mercy. It is bad enough to be a victim of senectitude. Why embitter old age by committing it to the care of a geriatrist?

This conference of prospective experts is long overdue. It is high time that we should learn more about old age. The layman is confused and bewildered. He cannot make out whether it is a natural and normal thing or a disease. He wants to know what it is biologically, mentally and socially. Can an average man or woman of sixty-five to eighty hope to be fairly fit, reasonably alert and of some use to the community? Or is it only the rare and exceptional person who is likely to reach this standard while the great majority become weak, mentally ossified and a social liability?

Current talk and writing about extending the life span naturally interests deeply the candidate for a saner senility. Too often he misinterprets the statistics. He does not fully understand that the gains have been in the age groups under forty, especially in the group under five. He

[1] Delivered October 1, 1928.

confuses "averages," in which reduced infant and child mortality rates play so large a part, with "expectancies" at a given age. He ought to understand that so far the proof that much can be done to prolong the lives of persons who have reached the age of fifty is not exactly overwhelming. It is precisely on this point that demonstration is so much to be desired.

It would be academic to waste much time on the question whether the aged deserve so much attention from a social order which seems to use people up early and throw them aside. Primitive tribes which live on the brink of famine put old people to death. Modern societies have an economic margin which permits them to carry a heavy burden of work-free children, sick and crippled persons, delinquents, insane and old people who do no physical labor. The sympathy which finds expression in this care for the helpless and dependent is wrought into the entire social fabric and is a vital source of its solidarity. There is no support for the idea of a lethal chamber. Even to let a hopelessly defective baby die by withholding medical aid arouses clamorous public protest.

But a much better case than this can be made out for the social value of old people. Thinkers from Cicero to Stanley Hall have lauded the superiority of old age in reflection, character and judgment. The slogan "old men for counsel" has the momentum of repetition by many generations. In modern society mere physical strength plays an ever dwindling role: mental qualities take the leading parts. To conserve, stimulate and prolong the characteristic powers of old people is to make a significant contribution to the common welfare. This may not impress the young but their parents and grandparents will see and applaud the point.

For a fortnight you are to bring together a good deal of what is known about old age. Naturally, chief stress is to be laid upon the diseases of old age. I say naturally because the very character of your training and the results of your experience lead you to dwell upon the path-

ological. Your business is to detect disease and to do what you can to mitigate or to thwart it. You are primarily healers. You so regard yourselves. You are so looked upon by old people. These resort to you reluctantly when they must. You are associated with the idea of disease, not with that of health.

It would be unreasonable to quarrel with this state of things. You know a good deal about patching old people up or at least about minimizing their pains and I hope about cheering their spirits. But if you are really to make a success of keeping old people going strong, must there not be a change in your attitude and theirs? Must you not become associated in their minds chiefly with health and normality? Must they not come to look to you pretty steadily for counsel? In short, must you not become to them trainers to keep them fit, rather than solely healers to deal with their palpable ills?

One realizes how bored you get by this wearisome repetition of the idea of prevention versus cure. One is tempted to apologize, but, as Woodrow Wilson says in one of his essays, every new idea must go through "a period of much talk." The preventive theory makes progress so slowly, save in the fields of sanitation and epidemiology, that the talk must be kept going without pity or remorse.

An examination of your program discloses an overwhelming preoccupation with disease and only three or four papers which deal with the hygiene of old age. To be sure there is good reason for this. Much is known about disease; comparatively little, I fancy, verified and authoritative about diet, exercise, clothing and mental life of old people. The future trainer or health counsellor will need much new knowledge.

A passing glance will suffice for the theory that longevity is so largely determined by heredity that little or nothing can be done to prolong life. Even if people were like clocks wound up congenitally to run for longer or shorter periods, this misleading simile could be extended

to suggest that oiling and caring for the works are not a negligible means of keeping the timepiece going. This figure can be applied easily to the medical profession. Doctors ought to be like the mechanicians who take contracts to keep clocks going and on time, rather than emergency men to be summoned when timepieces stop or are too fast or too slow.

Just as the maturing layman should not be too cast down by the predestination theory of heredity, he ought not to be prematurely hopeful over the sensationally exploited outlook for simian aids to rejuvenation. This subject is to be dealt with in a paper on your program. Your profession can do much good by telling the truth about this and other modern substitutes for Ponce de Leon's spring. Punch's picture of grandfather climbing the window curtains after an overdose of monkey gland provides an admirable corrective.

There is no denying that the health trainer idea will have to be impressed upon old people quite as much as upon the doctors. It is another case of demand and supply. Both are needed; both exert reciprocal influences. One can imagine the natural process by which the aging man or woman will turn to the doctor for guidance and leadership.

The client clings to the idea of normality, shrinks from morbid introspection, longs to have fears allayed, seeks reassurance, bucking up, wants advice about ways of health and happiness. All this he craves, not from strangers and institutions but from a wise, sympathetic friend who knows him not as a case but as a human being in his family and social relations.

It is ironic that the old should need a general practitioner, with modern knowledge and skill dominated by the preventive and health training idea and this at the very time when the type seems to be in danger of dying out. The prestige and economic rewards of specialization, the

technical efficiency of organized medical facilities, the persistence of the curative emphasis the public's apathy towards prevention, the conditions of urban life, make the career of the personal physician less and less attractive. Unless an appreciation of his possibilities and an effective demand for his services can be created, rhetorical praise and tearful lamentations will be equally futile.

To be sure it is altogether possible that such a demand will not be made. Then old people must come to rely upon periodic examination systems, fortuitously discovered specialists, clinics and health centers, widely advertised panaceas, sage if conflicting advice of friends and all the other suggestions about health and disease in which modern society is so miscellaneously prolific. But even so the influence of a fortnight like this will do good. It will emphasize the special problems of old age, stimulate research, and let us hope advance by never so little the idea that health even for the aged can be made a positive goal; not merely an escape from disease.

THE PAINS, PENALTIES AND PROHIBITIONS OF OLD AGE—CAN THEY BE PREVENTED?[1]

Sir Farquhar Buzzard

Regius Professor of Medicine, Oxford

The invitation to address you tonight is an honour of which I am deeply sensible and legitimately proud.

It may be that I owe it to the fact that William Osler's academic mantle has recently fallen on my shoulders and may suffice to cloak my deficiencies, or perhaps to that generous spirit which invariably impels you to accord a warm welcome to visiting members of our profession.

May I cherish, at any rate, the hope that my association with the Oxonian home of one who was esteemed and loved

[1] Delivered October 4, 1928.

equally by you and by us, and who did so much to foster our mutual understanding and goodwill, will secure for me an audience full of sympathy and devoid of the faculty of criticism.

In one sense that association was still unbroken when I sailed six weeks ago, but the news of Lady Osler's death a few days later means that I shall return to find a house in Norhams Gardens empty of its gracious and hospitable mistress, and Oxford mourning—the loss of a citizen honoured and beloved for herself as well as for the memories she recalled.

One such memory, perhaps, may be recalled while discussing the problems of old age; I refer to the intense personal interest evinced by Sir William, and maintained by Lady Osler to the last, in the ancient inhabitants of those charming Ewelme Almshouses, of which the Mastership has been invested for centuries in the Oxford Chair of Medicine.

May I add that their standard prescription for these pensioners was nicotine and not chloroform!

It was, I fear, in a moment of lightheartedness, engendered by the prospect of my first visit to your country, and in a spirit of alliteration more worthy of journalism than of science that I chose the title of "The Pains, Penalties and Prohibitions of Old Age" for my address. Subsequent deliberation has left me humiliated by my ignorance of the task I had set myself and more than surprised at the temerity which prompted its conception. Indeed I must preface my remarks by a prayer for your indulgence in the interpretation I shall put upon these words and for permission to add to them the interrogatory phrase: *Can they be prevented?*

Much attention is being devoted by other speakers to the purely physical aspects of aging and of old age, to the evitable and inevitable changes which sooner or later overtake the more menial tissues of the human body, the bones, the joints, the muscles, the cardio-vascular mechanism, the

viscera and ductless glands. All of these may, and often must, modify in some degree the effective control of man's activity, mental and physical, based as it is upon the integrity of his nervous system.

But like all other bodily structures the nervous system must surely have a life-span of its own, an inherent and individual potentiality responsive to and, in respect to endurance, dependent upon the treatment to which it is exposed. Why, otherwise, should nature allocate to that great healer, sleep, such a generous share of life's scanty hours? Does not such a beneficent provision for the restoration and conservation of our highest nervous forces suggest that we possess a store of energy the economic use and distribution of which are worthy of closer study than they often receive? Realizing the meagreness of material available for scrutiny and analysis, the pitfalls set by our ignorance of the laws of heredity, the complexity of causes and the elusive errors inevitable in estimating effects—realizing all these and recognizing the difficulties besetting an attempt to discriminate between the influence of extrinsic pathological factors, such as may be exerted through the circulation, and that of intrinsic, more physiological factors, such as activity and repose, in determining the expedition or delay of senescence, it requires some courage, perhaps some impudence, to seek an answer to *this* question: Can an individual so order his life as to prolong its prime to the maximum, leaving out of count such morbid hazards in its course as may spoil the score of years?

I am presuming that in discussing this problem of aging and old age, we are really considering the possibilities of prolonging the prime of life to its utmost limits and not of perpetuating indefinitely a vegetable existence. And by the prime of life we mean that phase of maturity during which the highest faculties of the nervous system can be exercised, during which the mind not only lives but is alive. If that be so we can hardly content ourselves with the gratuitous advice offered in daily papers by decrepit

individuals who have survived nine or ten decades and who attribute their longevity to abstinence from tobacco, a vegetarian diet, wholemeal bread, a daily apple or dose of castor oil, but never to medical advice! Can science provide more enlightenment?

In the pursuit of an answer to my question, it may be well to recall for a moment the process by which the nervous system reaches its functional maturity. From infancy, through childhood and adolescence, to adult life the nervous system grows and develops, not by multiplication of cells but by bringing more and more neural centres into action, by creating a wider range of response to external impulses and by opening up and utilizing an increasing number of association paths. To what extent vital activity can be reckoned in terms of reflexes, conditioned and unconditioned, is a question which will occupy the minds of philosophers for many years to come but need not detain us here, although in that sphere of physiology there may be the seeds of a method by which the sensitivity of the nervous system to new reactions will in the future be tested with scientific accuracy. And, perhaps, the period of aging and old age is coincident with the decline and fall of neural sensitivity.

The rapidity of the evolutionary process is notoriously variable in different individuals, in different races and perhaps in different sexes and the same adjective may be applied to the age of its completion; hence the terms precocity and slowness of development. There is some doubt in my mind, however, whether evolution is ever complete, whether there is any stationary phase intervening between evolution and devolution, or whether, in popular parlance, a man ever ceases to be young until he begins to grow old. If that be so, then the prime of life should be regarded as a dynamic, not a static, era.

We may assume that, generally speaking, association paths once opened up and used are available for indefinite periods and, on the other hand, that there comes a time when paths, hitherto untrodden, no longer preserve their

potential right of way. Experience teaches us that the earlier a path is explored in life the smoother it remains, even if neglected for a while. Or, from the more physiological point of view, we shall agree that our responses are quicker and more accurate the earlier they are acquired, and that later on in life certain stimuli, if applied for the first time, elicit incomplete or no replies.

If, then, a man's neural sensitivity is the index of his age, its decline is expressed by his difficulty in retaining fresh impressions, his reluctance to forming new associations and his inadequacy in responding to unaccustomed impulses.

Our attention may now be turned to a consideration of the influence exerted by a number of more or less normal or natural agencies on the preservation of neural sensitivity, and in this pursuit we must not forget a law of wide but not universal application. I refer to the fact that its most recently acquired and its most highly specialized functions are the first to fail when, on the one hand, the nervous system is exposed to certain noxious agencies such as fatigue or various organic and inorganic poisons, or when, on the other, it suffers from a deficiency of certain ingredients normally provided by the glands, the food or the atmosphere. The child is naughty when tired, the youth irresponsible under the influence of alcohol, the steadiest of adults loses all judgment on reaching altitudes of oxygen want, and if, prevailing beliefs are of any account, we should all be giants of prowess if only we could absorb a sufficient quantity and variety of vitamines.

In discussing the influence of some of these agencies I must, perforce, rely chiefly on personal experience and observation, and any deductions I may make have but little claim to scientific support.

The nervous system is guarded against the harmful results of overactivity by the supervention of fatigue, with the result that repeated excess is rarely possible under normal conditions. We know that changes occur in nerve

cells as a consequence of physical action and it is to be presumed that similar alterations are associated with mental exertion. We know that physical rest is capable of effecting restoration in the one case and there is no reason to doubt that sleep has equivalent powers in the other.

When, however, we approach the problem of the permanent effects of excessive and repeated activity, with intervening periods of sleep, on the longevity of nervous mechanisms we must admit our ignorance. It is a popular and to some extent a professional belief that overwork is a factor of importance in the etiology of many morbid processes, in other words, that work may exert the properties of a cumulative poison. Staleness is something which we recognize as a condition from which recovery is easily made, and, in my opinion the view that there are permanent results of overwork commonly responsible for the onset of old age is one which we must accept with great caution, if at all. It is certainly not one's impression that it is the most active or even the most troubled minds that are the first to fail, The desire, however, that the process of aging, and even that death itself, may have creditable references and honorable mention is so human that the belief in this hypothesis of cause and effect is likely to long survive its exposition as a fallacy, if such it be, and to delay for many years the popular acceptance of the lesions of pathological anatomy.

In this connection it is not without profit to recall experiences familiar to all of us—the refreshing, the rejuvenating effects of a change in activity. A sense of intolerable fatigue engendered by intense activity in a limited field may be dissipated in a moment by altering the scene of interest. Translated into terms of neuro-physiology it may be asserted with some confidence that while it is comparatively easy to exhaust the supply of energy in a defined area, it is difficult to deplete the whole cerebral field of its natural resources.

Is it possible that herein lies a cue to one of the principles governing the prevention of the pains, penalties and

prohibitions of old age? I suggest that a multiplication of interests early in life, the opening up of numerous association paths in the nervous system is a measure to be encouraged and one which may well be calculated to check the advances of senility. Is it not true that among those whom we have known as young for their years the large majority have displayed a wide range of interests and sympathies. If the pains, penalties and prohibitions of old age are really preventible, then its pathos may be illustrated by the picture of a man of sixty who throws away his morning paper after reading the Wall Street news or by that of a woman of similar age whose mental appetite is appeased for the day when she has interviewed her cook!

And here I would say a word on the subject of physical exercise in relation to the inquiry upon which we are engaged. Fashions are notoriously fickle but every few years there arises a vogue for physical culture founded partly on aesthetic grounds, but largely on the fallacy that our good health has some relation to the size of our muscles and that violent muscular exertion is a valuable antidote to the poisonous properties of mental effort. I do not hesitate to say that I have seen a number of cases of exhaustion neurosis resulting from this popular conception of hygiene and there is little doubt that confusion reigns in the lay mind in regard to the relative merits of physical culture, the object of which is to develop muscles, and of games of skill, the *chief* advantages of which lie in the fact that they supply *mental* recreation. From the gerontologists point of view, therefore, athletic games are to be encouraged in that they add to the list of *cerebral* activities, to the sum of varied interests. Even when advancing years prohibit personal participation, the role of an understanding spectator is not to be despised.

Change, as a restorative, is no new suggestion, as a preserver of faculties it may be an important factor in deferring infirmity. But the elaboration and criticisms of its possibilities I must leave to your imagination if I am to

avoid the detailed consideration of the arts, muses and 'ologies and the more dangerous topic of polygamy.

In the interests of the human mind the ideal life may, perhaps, be described as a variety entertainment with a first rate comedy as its piéce de resistance.

From work and play to food is but a short and natural step and on this subject the comments I propose to make will be brief and to the point.

To the child, the youth and the young adult food is a legitimate and not always neglected source of enjoyment. After forty years of age, it should be regarded as a disagreeable necessity of life and as the chief menace to the preservation of mental and physical activity. A superfluity of food has all the attributes of a subtle poison and indulgence in it all the dangers of an insidious vice. I have no advice, no convictions to offer to the healthy individual on the subject of food except that he should err on the side of moderation, become a slave to no particular diet and pay little attention to the regularity of his meals. An occasional day of starvation is a hygienic measure of much value.

Many, if not most wives, contrive to shorten their husbands' lives, not always an unpardonable crime, by tempting and encouraging them to overeat in middle age. "Feed the brute" is as often a policy of extermination as of pacification! How many of the pains and penalties of old age would be averted if this dietetic principle were observed it is impossible to estimate but their name is surely legion.

No general laws can be laid down. Each individual is a law unto himself and if a man or woman of forty has not learned what kind and what minimum quantity of food suffices to maintain his or her health, the time has come to appeal for medical assistance and advice.

The crime of lèse-majesté is, I presume, unrecognized under a Republican Government and I may be permitted to make a short contribution to the liquor controversy in

so far as it is germane to the subject I am considering. The excessive use or abuse of alcohol will, without any doubt, shorten the effective life-span of the nervous system and particularly that of its highest faculties. On the other hand the physiological effects of alcohol in moderate and occasional doses are more difficult to appraise. The fleeting stimulation, followed by the longer but still transient blunting of the finest intellectual and inhibitory processes is a phenomenon similar to, but more rapid than, that which results from normal mental activity followed by fatigue.

It has undoubtedly agreeable and possibly recreative properties and if it exerts any harmful influence on the duration of cerebral efficiency, these are probably proportionate to the frequency of its occurrence.

At the beginning of this address I formulated a question: "Can an individual so order his life as to prolong its prime to the maximum limit?" I hoped to make it clear that the prime of life was intended to represent the acme of mental activity and that no attention would be paid to the modifying influence of the various diseases and accidents with which the path of life may be strewn. My inquiry was for principles which might guide the individual to his goal and has been limited in scope. Only such simple questions as those of work, mental and physical, play, fatigue, rest, sleep, food and drink have passed lightly under review and I ask myself at its conclusion for the principles which have come to light.

One was obvious from the outset—the avoidance of excess, not so much in work as in food and drink.

If there is another it is certainly the promotion of change, change in occupation, habit and diet. In fact the individual seeking to prolong his prime must not *order* his life too much. A judicious amount of disorder and of irregularity should be encouraged. I am conscious that this opinion in regard to the variety of activity and irregularity of habit, as powerful aids to preserving the elasti-

city of the human mind—and after all we desire to preserve our mental elasticity as much as the elastic component of our arterial walls—is not altogether orthodox.

I am aware that there are some who regard with anxiety the rapidity of life made possible by modern methods of transport and communication; and who declare that there is an increased sum of nervous disorders as the result of these changes.

But there is another and happier aspect. The judicious use of modern inventions—and judgment will follow as novelty wears off—will favour the diversification of mental and physical activities and facilitate a wider distribution in the expenditure of nervous energy, an end which, to my way of thinking, is very desirable.

Nervous disorders are most common among those members of the community whose interests are few and whose fields of action are limited. Regular work, regular play and regular meals and regular hours of sleep may be the slogan of the health expert and may indeed be the guide to a prolongation of life. But we don't want to prolong life; we want to put off that evil hour when our mental horizon begins to narrow, our views become more rigid, our tolerance, sympathies, insight and interest less wide. Rather death than life spent under the tyranny of years!

OLD AGE AND WHAT IT MEANS TO THE COMMUNITY [1]

LOUIS I. DUBLIN, Ph.D.

Statistician, Metropolitan Life Insurance Company

Interest in the problem of old age is perennial, because we forever grasp at the hope that we may, somehow, stave off those nightmares of life, senility and death. It is, therefore, of the very first importance that physicians in any

[1] Delivered October 1, 1928.

discussion of old age begin with a clear-cut definition. The words "old age" have a wide variety of interpretations, all in good current usage. For twenty-five years, at least, painstaking scientific work has been striving to differentiate between chronologic age and physiologic age. This distinction was at first applied especially to the period of adolescence; but its most significant application belongs to the very period with which we are here concerned. Defining the two terms "chronologic" and "physiologic" brings into sharp relief the problem of aging which occurs when pathologic changes run ahead of normal processes and bring about a premature state of old age. As physicians, you are primarily concerned with old age as a pathological phenomenon and with the processes which accelerate aging. On the other hand, as a statistician, I am more concerned with the chronological aspect of this subject, since that presents definite entities which permit quantitative analysis. Possibly by combining the two points of view we can throw increased light on the whole subject and thereby clarify the social implications and problems which concern old age and aging.

And so, speaking as a statistician, and having in mind chronologic old age, I shall arbitrarily classify as old people all persons sixty-five years of age and over, realizing, of course, that there are all degrees of old age disability from sixty-five years onward to the end of the life cycle. There are a number of definite facts to which I would call your attention in outlining the field with which we are concerned. In our country, four and a half per cent. of the population was, in 1920, 65 years of age and over. This means that there are approximately five and a half million so-called old people in our country. Of this number, 1,680,000, or 1.4 per cent. of the population, are 75 years of age and over; 240,000 or 0.2 per cent of the population, are 85 years of age and over, and there are presumably 60,000 who are over 90 years old. According to the 1920 census, there were 4,267 centenarians. But of this number, 69 per cent. were reported as negroes which is, of

course, far in excess of the relative proportion of the negro in the population. The stated number of centenarians is grossly exaggerated, since many pretend to attain the hundred-year mark who have no right to that distinction. As our census machinery is improved from decade to decade, the number of reported centenarians has become much smaller.

Sex differences among the aged are particularly interesting. There are about the same number of males and females in the entire group, in spite of the fact that males constituted in past years a much larger proportion of the immigrants. In 1920, in the age period fifty to fifty-four, there were 115 males for every 100 females; in the sixty-five to sixty-nine year group, there were 109 males; between seventy and seventy-four, there were 103 to every 100 females. But from age seventy-five onward the relations are reversed and the number of females greatly exceeded the number of males. After age ninety, for example, there are three females for every two males. The increasing proportion of females to males at the older ages is clearly the result of the woman's much lower mortality at the advanced ages; but this statement likewise holds true throughout the entire range of life. Were it not for the heavy additions of male immigrants, females would far outnumber males at the age sixty-five and over.

The proportion of old people in our population is constantly changing. As I have said, at the time of our last census they constituted four and a half per cent. of the population. But in 1850, the ratio was only 2.9 per cent. We were then a young and vigorous country growing very rapidly as a result of high fertility and the heavy immigration from Europe of young people. The last seventy years have seen marked changes in our demography which are becoming more and more accentuated with each decade. As in other countries, our birthrates are constantly declining and are now only a little more than half of what they were fifty years ago. Nor is the end in sight! At the same time, we have seen fit to close the gates to immigrants from

abroad who supplied us with large numbers of young and vigorous people. We may, therefore, look for an ever-decreasing proportion of young together with an increasing proportion of old people, because as we lower the scales in one direction they go up in another. We have recently calculated that if the present fertility and mortality continue unchanged we shall have, ultimately, more than nine per cent. of our population over 65 years of age. And if, as seems very likely, our population becomes stationary, or a condition is reached when the birthrate and deathrate actually balance each other, then we shall have a population in which 10.7 per cent. will be 65 years of age and over. In other words, out of every ten people more than one individual will then have to be classified as old.

I need hardly dwell on the significance of these changes which have been taking place and which will continue to go on under our present customs and our recent immigration legislation. It is obvious that an increasing proportion of old people will affect very seriously the mental atmosphere in which we live. It will also influence the amount of relief necessary to care adequately for the aged thus producing new social and economic problems. But today we are more concerned with the problem of old age as it confronts the physician. Let me raise, as the best approach to this subject the following questions: Has the increasing proportion of old people carried with it longer life? And has our capacity for longevity increased with our ability to bring a larger number of people into the period of old age?

Much confusion has existed on this score. In recent years, the lives of infants have been spared in large numbers and the mortality of young people has been materially reduced. Consequently, the average length of life of the community as a whole, has unquestionably been greatly increased. The usual measure of this average duration of life is known as the expectation of life at birth. In 1840, this figure was, in the United States, approximately forty-one years. It is now rapidly approaching 60 years.

In other words, there has been an extension of almost fifty per cent. in the average life expectation. But as I have said, this is due largely to the saving of lives at the younger ages. When a baby's life is spared, there is a high probability that a large number of years have been added to the total score of the community. On the other hand, there has been hardly any extension after age fifty. In 1840, the expectation was about twenty years at age fifty, which means that the chances were even that a person 50 years old would reach seventy years. In 1920 the expectation at that age was only twenty-one years, making the gain in the interval of seventy years almost negligible. That shows that the life span itself, that is the ability to round out a long life, has been affected hardly at all by the newer developments in hygiene and by the improved economic conditions of the last half century. Moreover, the diseases and conditions which predominate in old age have not come under control. Cancer, as everyone knows, is even on the increase, and Bright's disease and heart disease show little tendency to decline. In fact, heart disease and the other so-called "degenerative diseases" have come into greater prominence and are now by a very large margin the leading causes of death. We may, therefore, say that even if there is a larger measure of life for the average man in the community, we have by no means learned how to stretch the life span itself more than a very small fraction. The biblical limitation of three score and ten applies as much to-day as it ever did.

But constantly it is suggested that this condition need not endure and that the life span itself can be extended so that it shall keep pace with future additions to the average life expectation.

It is often claimed that the process of aging in most cases is premature; that it in reality results from illness or some pathological process, usually unrecognized, which produces functional and structural disturbances causing old age and death. Those who hold this view have much evidence to fall back upon. It is only too true that care-

ful physical examinations of adults show that many apparently in good health are already suffering from disabilities of greater or less importance, including impairments of the heart, of the kidneys, hardening of the blood vessels, serious overweight and a hundred and one other conditions which indicate that all is not well with the human machine. In many instances, such impairments can readily enough be traced to previous infections or to existing infections. In other instances, they are probably the direct result of poor personal hygiene, such as over-eating or other bad habits, which throw the entire physical and nervous mechanism out of gear.

Reasoning along these lines, it is further claimed that these impairments are not at all normal or necessary, but rather fortuitous and unwarranted factors which break into our lives and which can either be prevented altogether or checked so that they need do no serious damage. The all-important consideration is that they shall be discovered in their incipiency and treated in a sensible manner through medical care. Those who believe this, assert that through the discovery of such impairments and their proper treatment, the process of aging can be staved off for a considerable period of years at least, so that ultimate senility and old age may be delayed twenty years, thirty years and perhaps even longer. These proponents of a metamorphosis which will result from good individual hygiene believe that they have solved the question that I raised very definitely. According to them, the life span can be materially lengthened and concomitant with this will go an extension of life expectation. They believe that the life span will reach beyond the century mark and well into the second century. Professor Fisher of Yale University is especially eloquent in his claims that human life may soon be lengthened well beyond the age of a hundred years and that this heritage of a happy old age may be available to a very large portion of the people.

My own work in this field makes me more conservative than Professor Fisher. Some years ago, when I investi-

gated intensively the problem of the life span, I arrived at the conclusion that, with the limitations of our present knowledge, the deathrate can not be materially reduced after age seventy. On the other hand, the deathrate can still be cut down at the younger ages, somewhat less through the whole of middle life and slightly up to the very threshold of old age. Such improvement in the deathrate would, of course, result in bringing more and more people into the period of old age. But after they arrive there, they will be subject to the same forces which have been operating for some time and will continue to succumb to these at about the same rate. I now believe, however, that my earlier point of view may very well prove too severe a limitation on human ingenuity. We have not yet exhausted all the possibilities which modern medicine puts at our disposal. Is it not possible that through the application of community hygiene on an ever-increasing scale we will overcome the ravages in adolescence and early manhood of the communicable diseases, diphtheria, scarlet fever, measles, typhoid fever, and even of pneumonia? As we cut down the number of such diseases, will there not be fewer impaired hearts, kidneys and blood vessels and will there not be larger numbers of persons arriving on the threshold of old age in far better physical condition than they are now? And may we not hope, likewise, that the application of the rules of correct personal hygiene will accomplish much in attaining even better results? If the findings of physical examinations were taken seriously by more people and steps were instituted at the beginning of disease processes to check the ravages of the pathological conditions discovered, would not larger numbers of persons outwit death and arrive at old age with greater vigor and consequently with a longer life expectation? It is hard to see how such conclusions can be disputed in the light of the experience of the last ten years.

The annual physical examination made under good medical auspices and followed up with enthusiasm and intelligence is the key which should open broad vistas in staying

old age and in extending the life span. Studies which we in the Metropolitan Life Insurance Company have made during the last ten years show conclusively that the periodic physical examination can be made a potent factor in life conservation at the older ages. In 1914, the Metropolitan offered certain groups of its policyholders the benefit of a medical examination at the expense of the Company. Later, we tabulated and analyzed the subsequent mortality history of the first 6,000 persons who were examined in this experiment. The records covered a period of nine years and we found a saving of 18 per cent. in the expected mortality of the group as a whole. We found that the improvement in mortality was greatest during the first five years after the examination. Thereafter, the gain declined year by year until in the ninth year, the mortality experience on the examined lives was virtually the same as that of the whole body of Ordinary policy holders which we employed as a control. One of the great surprises of the investigation was the fact that a group of about 1,400 of the original 6,000 who showed such serious impairments at that time as to make them ineligible for standard forms of life insurance gave a mortality only slightly in excess of that expected according to the American Men Table. It is difficult to understand such a result except on the assumption that these persons when informed of their physical defects were particularly careful to get good medical advice and care, to improve their personal hygiene, and to do the other things that their medical reports indicated. There is much evidence to show that this very thing happened; for many of these people took advantage of the offer of the company over a series of years and the subsequent records showed that many overweights corrected their conditions; others improved or entirely eliminated their faulty habits; still others were able to eliminate the presence of albumin and casts in their urine and other defects were likewise corrected. The later reports indicated that the medical advices which had been given were taken seriously. In no other way, can we explain the very low mortality the company experienced on the group of policy-

holders who accepted the privilege of the physical examination.

We, in the company, consider this experiment a profitable one not only to the policyholders but to the company itself. A saving of 18 per cent. in mortality when translated in terms of reduced death claims and increased premiums much more than paid for the cost of the examinations. In fact, our estimate at the end of the first five years was that the company had received two dollars for every dollar it had paid out for the examinations! It was for this reason that the executives of the company have constantly broadened the scope of the examinations to include an ever-increasing group of policyholders. At the present time, the privilege of the examination is taken advantage of by a group of a hundred thousand ordinary policyholders a year. Over 600,000 have already availed themselves of the company's offer. In the meanwhile, a large number of other insurance companies have offered the same privilege to their insured and many employers have done likewise for their employees in shops and factories. We who are closest to the operation of the annual physical examination believe that this is a clear-cut method of adding years to the life span of the average man.

The disparity between chronologic and physiologic old age can, therefore, be bridged. It is the thesis of this paper that sickness is the main cause of premature aging and that much of it is preventable. To summarize our argument, community hygiene, on the one hand, will in the future reduce the number of cases of the communicable diseases and obviate the dangerous sequelae to the vital organs; but personal hygiene, on the other hand, guided by the increasing interest of the medical profession will stay the processes which lead to organic degeneration. What these combined forces will do in lengthening the life span is still a good deal of a question. I have no such optimism as Professor Irving Fisher, but I do believe that the outlook is good for adding whole years to our present allot-

ment. The measure of success will depend largely on the enthusiasm and understanding with which this double-headed campaign can be launched. But before we can even plan such a campaign, we must have a better command of the facts and know more than we do now of the underlying causes of mortality and of morbidity, especially at the middle ages of life. We are, to-day, woefully lacking in knowledge of the processes which produce aging and degeneration. Research into the causes of such premature aging would yield information of inestimable value. Fortunately, the files of physicians contain the facts upon which a wise future policy must be based. If they kept full and accurate records of their cases of the degenerative diseases, it would be a comparatively easy matter later to determine some, at least, of the processes which we must combat. Possibly no better result could come out of this symposium on old age than the organization of such a coöperative research into the causes which make for premature old age. Every physician in practice can play his part in such a venture.

DIETETICS IN OLD AGE [1]

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When we are young I think most of us wonder why anyone desires to live to old age, with its physical difficulties and mental deficiencies. In middle life we become more tolerant, thinking there may be some excuse for becoming old; while after we pass sixty, and are very sure it is most desirable, we will attempt almost anything which promises to prolong life, even if our ideas on the subject are vague, and procedure uncertain. Leaving aside, therefore, the large question as to what practices in youth and middle age may reasonably assure a long life (questions of much depth and complication), we shall confine ourselves to those already old; considering whether through

[1] Delivered October 4 ,1928.

forethought in diet, they may expect even longer life, and that with health and easy regulations alone.

The discussion of "Dietetics in Old Age" necessitates encroaching upon topics assigned to other speakers, but I shall endeavor to minimize this intrusion as much as possible.

Age is a period associated with innumerable theories. Each individual who lives a long while ascribes his success to some particular pet theory. In one instance, to the moderate use of alcohol; in another, to the abstinence; in another to its frequent use. One to the fact that he has never smoked, and another to the fact that he has, giving him mental relaxation, as well as stimulation of the intestinal tract. There are many peculiar and individual diets, such as a one-type diet, infrequent eating, frequent eating of small meals, this or that particular kind of food, and other rational or irrational theories; but in the final analysis it is probable that most people who live to old age have come from long-lived families. This tendency may be modified, of course, by indiscretions of diet, mental activity, or physical work, but the essential is that we find in certain families a tendency to live long extending through many generations, just as in others we see the contrary. It is probable, therefore, that the first requisite for longevity is to be born with such a tendency.

Moderation is the key-note of dieting in old age, and I quote the following from Osler as probably best expressing the attitude we should assume in this period of life:

"The famous George Cheyne, a man of enormous bulk, reduced himself by dieting from 448 lbs. to proper dimensions. One of his aphorisms says, 'Every wise man after fifty-eight ought to begin to lessen at least the quantity of his aliment; and if he would continue free from great and dangerous distempers, and preserve his senses and faculties clear to the last, he ought every seven years to go on abating gradually and sensibly, and at last descend out of life as he ascended into it, even into a child's diet. Put in other words, it reads, 'after fifty years of age we eat too much.'"

I have in mind two brothers, one ninety-two and the other ninety-eight. The elder ascribes his age to the fact

that he has been a very frugal and simple eater, never taking more than two meals a day, and frequently only one. In addition to this he abstains totally from alcohol and tobacco, and is convinced that he can live for an indefinite period. The younger brother, who at ninety-two has lived generously, over-eaten, and used alcohol freely, thinks in turn that he has been able to maintain his health and strength because of the food and alcohol he has consumed. It again but illustrates the fact that as we get older everyone has a pet theory to account for his living to old age. The investigation in this particular instance revealed that the father of these two men died at ninety-eight, and that his ancestors before him were very long-lived.

Closely associated and directly related to the question of diet is that of relaxation in old age. By relaxation I do not merely mean sleep, in fact old people require less sleep as a rule, but ability to relax mentally and physically can be cultivated as a habit. It must be done systematically and if properly carried out will greatly facilitate and aid diet in prolonging life. I have in mind an individual who in middle life was condemned to short life and sure death, due to over-eating, over-work, and many other over-activities. He is now eighty-seven years of age, and his good health, in my opinion, is largely due to the fact that he was able to teach himself to relax. From four to six o'clock every afternoon he goes to his room, and no communication of any kind can be had with him, either by telephone or message. He is entirely out so far as every activity is concerned, and knows that he is not to be disturbed. He does not sleep, but has developed the art of physical relaxation to its maximum. At the end of his period of rest he is almost rejuvenated. He has carried out this plan through many years, and in spite of the fact that he is rather a generous eater and smokes immoderately, he is an active old man and thoroughly enjoys life. Incidentally at eighty-seven he made two trips to Europe this summer, which is his custom, returning to New York about the first of August because he says that "in England they do not know how to cut hair," immediately sailing again to com-

plete his summer vacation abroad. It is easy to see from the above facts that he is a man of many theories, but the practical point is the fact that he has learned to relax, and this associated with a perfect digestion, has made him a happy old man.

The question of alcohol is important, and whether it has any food value or is purely a stimulant has been often discussed. It is not necessary to go into this controversy, and I am only expressing my own personal views in saying that I am very sure that alcohol in moderation is most useful for people after sixty years of age, or for those even younger if old age is premature. It is a pleasant, quick stimulant, and even if devoid of food value, which is debatable, aids digestion, picks up the circulation, stimulates the cerebrum, and makes the picture prettier and the day shorter. This in itself seems to be of great value for those in the latter stages of life.

In arranging diets we must distinguish between the individual who is old in point of years, and the one who is physiologically old; who in other words has acquired his old age from dissipation, excessive work, bad hygiene, etc., and thereby becomes old prematurely. It is necessary to give a higher protein diet to this second type than to those normally old, since protein is necessary for the cell repair; and the mistake of classing all these cases under one head is often made. While for ordinary old age protein may be cut very low, in the latter type, due to depletion, at least three calories per pound of body weight are needed against the one and one-half sufficient for the true old age types.

People who desire to prolong life through food regulation should begin with the careful construction of balanced diet in middle life, gradually cutting down the protein as they advance in years, but maintaining the balance always. While there may be exceptions, the evidence is all in favor of properly balanced mixed diet throughout life. Starting during the period of activity with a considerable factor of protein, carbohydrates and mineral

salts, the first two should be gradually decreased, but in a logical manner.

Starvation should be avoided, and it seems that many people would be much happier if they could be prevented from punishing themselves with the many unabridged theories that are so much in evidence. It should be remembered, however, that if an individual has established a diet for himself through experience and study which has satisfied his requirements over a period of years, it is best not to disturb or change his habits even though we may feel that they are scientifically incorrect. Sudden modifications are apt to be disastrous in this period of life. It is quite essential that regularity be stressed in the feeding of old people; and if they are underweight, frequent eating in small quantities is advisable. Without any doubt milk, or milk products, are the most satisfactory foods for old people that we have, for they contain all the elements of food, and are most easily digested. Metchnekoff's work with his sour milk, while it was a disappointment to him in as much as it was not a panacea for old age, and did not prolong life indefinitely, as he had hoped, undoubtedly has much merit. The more recent modification with the acidophilus, the advocacy of the sour goat's milk, with many other products of this kind, form a type of diet that is distinctly beneficial for many people.

A mixed diet in proper proportions is probably without question most sane and efficient on the average. Fruit, eggs, fish and vegetables, with the exception of peas, beans and cabbage, unpolished rice, sage, arrow-root, tapioca and bread puddings are easily digested. Rice puddings and pastries should be avoided. Cooked or fresh fruits may be taken freely, as they contain many of the salts necessary for life and are free from the toxic effects of protein. This element of the diet, to my mind, is not utilized sufficiently by old people.

There are many differences of opinion regarding the proper number of calories necessary in old age. Roughly speaking, from 1300 to 1500 a day should suffice, while

50 grams of protein, 120 of carbohydrates, and 30 to 40 of fats, are about average; yet this differs again with the individual. When a stage is reached where teeth have been removed, protein must be cut down because of the inability to masticate, but this loss of protein may be equalized by an increase of milk and eggs.

A further serious problem of old age is over-eating, which in many instances is more habit than a desire for food, since the sense of taste is greatly diminished at this time, and large amounts of salt or seasoning are often required to make food palatable. Tendencies toward retention diseases, such as gout, rheumatism, kidney deficiency, high blood pressure, and such conditions are easily developed from this source. We must remember that not only is less energy needed, but there is a deficiency in function and cell activity which prevents proper elimination, and therefore indiscretions in feeding, cause accumulations even with relatively small quantities of food. The best results are usually obtained when the day is divided into periods of three hours so that five or six small meals are taken.

Reverting again to the question of alcohol, it is my belief that beers and malt liquors have a decided food value in old age, and that small quantities of sherry, port, claret or sautern at meal times aid decidedly in stimulating gastric digestion.

We are also often forced to counteract the tendency of old people to refuse vegetables; the reason usually given being that they produce flatulence. If properly cooked and slowly eaten, however, this objection may be largely overcome, or if necessary artificial digestants such as pepsin and hydrochloric acid may be added, for moderate consumption of such foods at this time of life is generally advisable.

There is a close relationship, too, between sleep and feeding in old age, and it is essential that ample sleep be obtained. It is often necessary to give a glass of hot milk or

vichy and milk, or a little hot liquid food of some kind at bed time in order to induce proper relaxation. If there is any tendency on the part of age to develop obesity, the diet should be modified before this becomes burdensome. On the other hand, any tendency to lose weight should be watched for with equal care, and the quality of diet altered as the case demands. In other words, maintain a balance in which neither excessive gain nor excessive loss becomes a factor.

Great care should be observed to correct any tendency for constipation, which in the main would probably be due to a poor muscle tone. At the same time its presence accelerates the tendency to putrefaction in the intestinal tract and produces a retention toxemia which may become a matter of some seriousness if it is not corrected.

Whenever possible the noon meal should be the main meal for old people, and a positive prohibition should be placed on any exercise immediately after meals. There is a tendency for older people, particularly men, as a result of a sense of vanity, to endeavor to display their physical powers; I am especially referring to golf, and there have been a number of disasters as a result when this exercise is taken immediately after meals.

If there is any tendency to hypertension a chemical study of the blood should be made, and a restriction or practical elimination of the sodium chloride from the diet.

Many diets have been arranged for old people, but I know of nothing better on the subject than a quotation from Doctor George S. Keith's "Fads of an Old Physician," which was written in his seventy-eighth year, and is as follows:

For breakfast I have a large cup of tea, with milk or cream; brown bread from two to three ounces; and usually one and a half ounces of fish, or half that quantity, and that very rarely, of bacon. Sometimes for a few days I take a cup of coffee with half milk, but no fish or bacon. Lunch is a cup of cocoa or chocolate, if the weather be

cold; and if it is warm, a small tumbler of milk, about six ounces, with the same quantity of bread as at breakfast. At both meals I use butter, not a quarter of an ounce, and quite as much jelly as marmalade. This is my usual lunch, but occasionally instead of cocoa I have a baked apple, or some prunes with milk, or strawberries with cream so long as I can get them, or, very rarely, vegetable soup. When I have no milk I usually take a morsel (not half an ounce) of cheese. At 4 P.M. a small cup of tea, and sometimes biscuit or cake. For dinner, at 7, which is my chief meal, I have soup, from peas, lentils, potatoes, celery, carrots, etc., the first two made with no meat stock, and the others with a little from lamb or a bone; or fish soup, the only animal soup I indulge in. Fish, mostly white deep-sea fish direct from Montrose; of this I take no more than three ounces, with a potato and always another vegetable fresh from the garden. If there is no fish, I may take once or twice a week an ounce or two, certainly not more, of lamb, game, rabbit or tripe; but often I have neither fish nor flesh. The dinner ends with stewed fruit with cream, or pudding or fruit tart; of these I take a fair helping. During the winter season, instead of fruit or pudding, I often have celery, with cheese, oatcake and butter. On this diet I enjoy the best of health, and for my age am up to a fair amount of exercise, walking three to six miles daily in good and sometimes bad weather, and usually part of this is up a steep road with a rise of 250 feet. The only confession I have to make is that when at home I do not rise till I have had breakfast and read the newspaper. This is a habit I have recommended to many approaching my own age, and those who have tried it admit that they are stronger for the rest of the day. I enjoy breakfast just as much as any other meal, though I never feel what can be called hunger, and have not done so for many years. I could omit a meal at any time without discomfort. This I have long looked upon as the best proof of perfect digestion. During very warm months I take rather less bread and butter, and I do not try to make this up by taking anything else."

In conclusion, therefore, let me repeat, that although the most general causes of extended life are undoubtedly hereditary, much comfort and physical well-being may be gained by old people if they will moderate and take heed to their eating habits; which advantages in helping to sustain life must obviously protract it. The diet of old age, therefore, should be mixed, simple, small in quantity, and there should be frequent feedings, up to five or six a day. Emphasis should be laid on the fruit and vegetable factors, and great care taken to prevent accumulation and retention, especially of protein, for nourishment is always concerned as much with output as input. In addition, habit should be studied carefully in regulating or prescribing any diet for a person of advanced years; since it is well to remember that foods that are palatable to a man will generally be more easily digested and nourish him more than those of greater potential value, eaten without relish; and the habit of relaxation should be cultivated as an adjuvant of diet. In addition as previously stated, I personally consider alcohol in the form of beer or malt liquors to have a distinct food value.

PHARMACOLOGY IN OLD AGE [1]

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To be asked to discuss the pharmacology of old age seems to be at first thought, as broadly indefinite as if one were handed the pharmacopeia, and was asked what was in it.

Even with all the drugs at our disposal, however, the existence of old age strongly limits us in many ways. Age, like childhood, requires in general a diminution of the dosage to be given of any individual drug, as some drugs, such as morphine and belladonna, or even digitalis are definitely not as well borne, while others are much better

[1] Delivered October 4, 1928.

borne in old age than in early life, as iodine, or nux vomica, or alcohol, but in general, we must deal gently in the matter of dosage, as we must in other things with the aged.

The viewpoint of therapeutics has changed greatly in the last 30 years, whereas formerly the endeavor was made to control the symptoms, which were the annoying factors complained of by the individual, and where the basic factors of the disturbance of equilibrium in the normal glandular processes were unrecognized, because unknown, there is at present an increased use of glandular extracts, instead of drugs, to control the basic condition, through the modification of which the symptoms will disappear.

It has become increasingly evident that often hygienic care in the daily existence of the individual, will do more for him than treating his symptoms of disease. Regulating the existence of the individual will often prevent the necessity of dosing them with any medicine, and will lengthen in them a comfortable existence.

Many of the discomforts and many infirmities of old age can, however, be ameliorated by many simple remedies, and a knowledge of the physiologic action of drugs is often of great use in relieving chronic ailments and discomforts from which old people suffer. It is a grave mistake for young physicians, and really if one looks at it cold bloodedly, much against their self interest, to think that old age must necessarily suffer, and nothing can be done, and to look upon chronic incurable diseases as conditions in which amelioration, and often comfort, cannot be produced by the use of various remedies that are given deliberately to alter and control the symptoms complained of. But all this takes time, and the pharmacology of the aged demands more of the art of the practice of medicine than in any other group of patients. One must learn to unravel the real from the imaginary, and one must learn to listen to many reiterations, but the mere fact of willing attention, cheerfully bestowed, is often in itself the best remedy to rule out many imaginary ills.

In the present symposium many papers will be read on special subjects which will deal, not only with diagnosis and etiology, but with their treatment also, much more in detail than any discussion that can be offered to you in this paper.

Old age is limited in its activities, because the vigor of the human mechanism is diminished, but that does not mean that it should be a period of suffering and unhappiness, or discomfort. One must remember that there is a condition of the tissues, and the body, which is relatively normal for a person of that age, both in the period of senescence, as they grow old, from 60 on, and when the further limitations of the processes of degeneration have gone on so that there is a distinct evidence of the degenerative processes in all the tissues.

In treating the aged, however, one must not believe that it is possible to bring them back to the vigor of their middle age, but they can be made comfortable, and allowed to go on within the limits normal for their time of life.

Pain, however, is not normal at any time, and the medication of pain giving the desired relief, brings with it an invariable reward in the thankfulness and appreciation of the patient. Morphine by no means is the only medication that stops pain as in neuralgia, or severe neuritis, or the grinding pains of aching joints, or the headaches, and the various other painful afflictions, or even the pain of an inoperable growing tumor. There are many analgesiques which safely relieve pain, especially in certain combinations. For instance, the salicylates, either as sodium salicylate, or as asperin, or some times as Salophen combined with soda bicarbonate, and added thereto phenacetin, or pyramidon or antipyrin combined in small doses, as for instance 3 to 5 grains each, and given as a dose, and repeated in the hour, will often relieve pain much more effectively than when given every 2 hours, every 4 hours, or in a routine manner. This is particularly true in attacks of herpes zoster, which afflicts painfully the aged people.

Often two of these analgesiques combined, such as phenacetin and antipyrin, or pyramidon and antipyrin, or pyramidon and phenacetin will act much better than a double dose of either one singly. Acetanilid is effective but it is not as safe as the other analgesiques.

If codein is added to increase the analgesique powers of the coal tar preparations in any of the above combinations, it is much more effective than a double dose of either the codein, or of the other analgesiques alone. Old people in my experience, bear codein well, and codein has not the habit forming qualities of morphine, it is excreted by the kidneys, and not by the bowels as is morphine, and is not held within the body as long as morphine, nor has it the narcotic value in the effect produced that morphine has. In a rather extensive experience of habit forming drugs, I have seen very few codein habits, so few compared with the amount that I have used, and seen used, that the lack of habit producing qualities of codein is a striking peculiarity of the drug, considering its analgesique properties, and its sleep producing effectiveness. Codein mixed with a combination of the salycilates, sodium bicarbonate and one or more of the analgesiques produces a very effective pain-killing medication, and given in a small dose of ½ grain, or ⅛th of a grain, or even up to one or two grains if necessary, it is the most successful and useful combination that we have. Codein is easily broken off if one wishes to discontinue it without the disagreeable withdrawal symptoms, or disagreeable symptoms of any kind. In this it differs from morphine, for morphine, if persistently given for 2 or 3 weeks for pain, does on withdrawal produce the sense of discomfort, restlessness and annoying nervousness that may even amount to distinct suffering.

Even small doses of morphine, continued for three weeks, are liable to establish its narcotic habit forming properties, with the longing for more, and I do not believe that anybody is free from that possibility. In old people ¼ grain of morphine is a large dose.

Old age differs from youth in that, when it seeks a narcotic, it does not seek either in morphine or alcohol an inhibition of restraint such as youth desires, but it seeks the relief of forgetfulness, and the obliteration of its pain, or its mental troubles, and the narcotic desires of old age are the strongest of all, because it is the desire often to forget the irredeemable past, and the memories of it; but codein does not bring that narcotic comfort, it is a pure analgesique, from which recovery is sharp, and not prolonged.

Old age is not so subject to sleeplessness as middle age with its wear and tear and incessant worries and struggles. The diminished vigor of the cerebral circulation of the aged in itself tends to bring about drowsiness, and old age, with its reduced activities, does not require as much sleep, and wakes earlier, nor does it spend the weary hours of wakefulness where the worries and anxieties cannot be solved, as in middle age. But the fear of not sleeping will often terrify the aged, and must be considered. If pain keeps the aged awake, with a combination of 5 grains of trianol with one or two grains of codein given in a little warm milk, or with little food of some kind, for trianol will not act quickly unless given during the process of digestion, a very satisfactory slumber is obtained. Trianol is infinitely better with less disagreeable reactions than the barbituric acid group of veronal, medinal, dial ciba, baritol, allonal, luminal, or any one of that group, for with them is apt to be left behind the heaviness of too much drug, and there is something in the barbituric acid radical that perverts the emotional values of personality, so that a good natured patient of kindly personality is often turned into an irritable, irascible, sharp tongued person that prefers to say the mean thing rather than leave it unsaid, and prefers to refuse to acquiesce in any thing rather than to co-operate with his family or physician.

I have seen sudden attacks of dizziness and injuries from falling due to the disturbance of the equilibrium, from the use of medinal in ordinary 5 grain doses, and I

have seen in the same patient a distinct hemianopsia, all of which cleared up when the medinal was cut off. The patient's symptoms puzzled me greatly, for I could obtain no history, until his obstinate ugliness became so marked that it seemed as if his unreasonableness could only come from a drug poisoning, which proved to be the case.

I do not mean to say that all patients will be poisoned and perverted in this way by the barbituric acid group. I have, however, seen this perversion and poisoning from every one of its preparations that I have yet encountered. The barbituric acid group in an alcoholic solution needs less of the drug to produce soporific effects, and also acts more quickly. But the toxic actions also occur with smaller doses. Any of the barbituric acid group are unquestionably habit forming drugs, and when used in excess may even produce a distinct psychosis from which it may take weeks to bring about recovery. Habit forming factors may also be said to reside in trianol, but the excessive use does not disagreeably pervert personality, and the patients that I have seen with the trianol habit, have been gently and good naturedly demented, and easily managed without the ugliness of the barbituric acid group.

One cannot speak of pain in old age without bringing up the distressing picture of the forms of arthritis, which are so crippling to the aged. In this period of life the real rheumatism that tends to leave the joints uninjured is rare. The gouty, non-infected joints, and the acute stages of gout are often relieved best by the tincture of colchicum pushed until purging begins from it. Another effective preparation is the French capsule of Colchisal, given for several days in diminishing doses, or given in 5 or 6 capsules 3 times a day until the purging is noticeable. Local applications of menthol and methyl salicylate ease the pain. For the continued relief, after the acute pain has subsided, the colchicum does not suffice, and the tonic treatment of iodine in the form of the potassium iodide, or better, the iodide of iron, is a very effective tonic given in not too large doses, that is not in the 15 or 20 minim doses

often given, but persistently kept up in less than 10 minim doses after meals, it will often stimulate the general nutrition of the patient, and with its stimulation of the thyroid, and its improvement of the anemia, benefit greatly the general health. The improvement of the general health of the patient is important, as gout in old people is often produced as a symptom of exhaustion, or as an idiosyncrasy against the ingestion of some definite kind of food, rather than the expression of the excessive eating and drinking as in middle life.

Since the dangers of focal infections have been realized, and their causal relationship with arthritis known, one sees less than formerly of the infected joints in the aged; the best treatment is that of vaccines. Small doses of a stock vaccine, and with a small number of bacteria in each dose, rarely above a total of 1,000,000 of mixed staphylococcus, streptococcus, with or without colon bacilli will, if given every 3 to 5 days, and persisted in for a number of weeks, given as the patient can best stand it, without systemic reaction, in the end stop the painful processes, and improve the condition.

The autogenous vaccines when given in large doses seem to result, in my observation, in causing a terrific reaction, often defeating the results desired. The foreign proteids, as milk, seem definitely to be effective in ratio to the number of the dead bodies of the bacteria in the sterilized solution, and it would seem that the dosage could be more accurately regulated when a stock vaccine is taken of bacterial proteid of known amounts.

The belief that a fever and reaction is necessary for the production of relief, in my experience has proven to be an unfounded belief. The best results in the relief and cessation of pain have followed more quickly and evenly when the small non reaction giving doses have been used over long periods of time; the relief from the pain is soon noticeable, and if persisted in this method gives gratifying results.

Digestion in the aged, like all functions is often impaired. Thewlis draws attention to the fact that the indigestion of the aged is relieved better by alkalies than by acids, and it is noticeable in giving nux vomica and hydrochloric acid to the old person, they soon find that they suffer from a sense of excessive acidity. That main stay to the medical profession of therapeutic procedure, soda and rhubarb, is most valuable in these patients. Many patients dislike the essence of peppermint that is put in the official mixture. In many of the aged small doses of quinine act as a stimulant, and in giving soda and rhubarb, if instead of the peppermint, two or three drops at each dose of the compound tincture of chincona be added, the soda and rhubarb forms a vastly better digestive mixture. It is not necessarily a large dose of the bicarbonate of soda that is needed, for even a grain or less to each teaspoonful is efficacious. The pleasures of eating are one of the few pleasures that many of the aged have left, and naturally they are prone to cling to it as long as possible, knowing full well that if they give up the pleasures of the table, they give them up for good, but dietary management of the aged is not in the pharmacology, and I leave it to my confrere, to whom it belongs.

In the constipation of the aged, and in some few who persistently can not refrain from over eating, an effective laxative, or even a vigorous purge is not harmful, and often is beneficial. Even in the aged, dietary regime can effectively assist, and even control constipation, but the muscles of the colon lose their vigor as the muscles of the rest of the body do, and a very useful and effective pill is the compound rhubarb pill of the pharmacopeia, two at night is usually an effective dose, and it is especially valuable, because of its content of aloes, each pill containing 1½ grains, and aloes act especially on the lower portion of the colon. Cascara sagrada is an excellent laxative, acting especially well in its aromatic fluid extract, and can be taken for a continued length of time, longer than most laxatives, without lessening its effect, for all laxatives tend to diminish in effectiveness as is well known. Senna, as

in the compound licorice powder, or as the confection, or as prunes and senna leaves acting on the muscle of the intestine, is often effective for a while, when the continued use of some other laxative has lost its effect. Its action is somewhat similar to that of castor oil, although not so effective as this well known purgative, and castor oil is the most effective of the purges in all ages. Calomel in divided doses, up to a grain, seems to be better borne than the single larger doses, but often the old fashioned form of blue mass is extremely well borne, and 2 to 3 grains of blue mass, combined with a compound extract of colycinth with either a dose of ipecac, or of extract of hyocyamus to prevent griping, is an old fashioned but very effective purge to clear out an over loaded colon.

As the rectum in old age tends to lose its folds, and to lose the tonicity of its muscles, and become flaccid, the aged are prone to have impaction at this point. The most effective solution to break up the mass that has formed is 8 ounces of water, ½ ounce of solution of peroxide of hydrogen, and a teaspoonful of bicarbonate of soda; the peroxide of hydrogen is not a permanent solution, unless in the presence of acid, and the acid solution forms a very marked irritant to the rectum; the bicarbonate of soda neutralizes the acid, and makes an alkaline solution, which is not irritating, and if the solution is used immediately, after the addition of the soda, the peroxide remains effective. This solution causes a disintegration of the mass, and an ordinary soap suds enema following it, is effective, where it otherwise would fail. This disintegrating enema can be given every two hours, and after a few injections the impactions break down and can be removed. It is the simplest method of breaking up these rectal impactions of old age.

Many old patients, especially women, suffer from large amounts of gas, and air in the bowels. This may be due to several causes. The attacks of gas may be one of the symptoms accompanying diseases of the coronary vessels, and coming on in attacks either with distension of the

stomach, or the bowel, form a very pronounced symptom in coronary disease, and are not usually attributed to their cause. The treatment of this should, of course, be directed to the vascular disturbance of the heart; nux vomica, or alcohol with meals will often assist the digestion in these cases, but of this we will speak later.

Another cause of intestinal distension is intestinal fermentation, then the lactic acid bacilli, or Acidophilus bacilli regime in milk, or in tablet form, when milk is not well borne, will often diminish the cause. If, however, this seems to fail, the capsules recommended by the late Dr. Delafield, containing 5 minims of castor oil, and 5 grains of salol, will often stop the intestinal fermentation, and diminish enormously the gases contained in the intestine. Some elderly women suffer greatly from gas, which is not relieved by any of these procedures. The pills recommended by Dr. John Rogers, made from the interstitial cells of the ovaries, will often in these patients, prove efficacious. Experiments show this form of ovarian extract produces an increase of pituitary excretion in the spinal fluid of animals. This inter-relationship produces an increased tonic condition of the intestines in which the gas does not form. If these so-called glystitial pills are given, they often produce a relief from the very troublesome and annoying condition in these elderly patients.

However advantageous the climate of a temperate zone may be to stimulate the young, and those in the vigorous years of life, its various changes and chills in winter are prone to produce a bronchitis in the aged, with or without its accompanying dangers of pneumonia. Often the beginning dry, hacking cough of an acute infection of the trachea and bronchii can be much relieved in the aged by stimulating the bronchial secretions. For this purpose small doses of one or two drops of the wine of ipecac, and the wine of antimony with ½ grain each of iodide of potash and ammonium chloride to the teaspoonful of water, given every 2 hours, are a very effective medicine to relieve this situation; larger doses of these medicines are prone to

nauseate, but the small doses increase the secretions, and give relief.

After a bronchitis has become established, the disinfection of the bronchii through the excretion of substances in the lungs, is often an effective method of treatment, and some form of creosote, as the carbonate of creosote, or some form of guiacol, is a very effective procedure. A dram of the carbonate of creosote in 4 ounces of water with ½ dram of gum of acacia makes a very simple emulsion, and gives 2½ drops to the teaspoonful. You see I am arguing here that a teaspoonful and a dram are not equivalent, and if one chooses to measure a teaspoonful, one finds that there are 6 to an ounce, and not 8, as there are drams, and a teaspoon contains 85 drops, and not 60. This argument is settled by actual measurement; measure the teaspoonful, and anyone will be convinced of the accuracy of the statement.

Codein is much used in coughs to stop the coughing, and in elderly people small doses such as 1/15th, or 1/25th of a grain are much more effective given every 10 to 15 minutes, for a few doses, mixed with cubebs and the extract of licorice. This method of giving it will stop the coughing at night that is so troublesome, and is much better than giving the doses of ¼ and ½ grains of codein which seems to be the method usually used, judging from the prescriptions of my hospital interns coming from many medical schools.

The current infections of bronchitis, or colds, and influenza that are prevalent in city life, bring with them the danger of the acute involvement of the myocardium, and often in the aged bronchitis persists, because there is with it this failure of the pulmonary circulation. When once this is realized, the attention to and treatment of the circulation clears up the bronchitis.

Often in old age in the recovery from these exhaustive intercurrent infections of bronchitis, and of influenza, it is of great benefit to give these patients alcohol with their

food, either with their meals, or with extra food between meals. This is specially true in the cases that show the cardiac involvement, or in those in which the nervous exhaustion following influenza is present in a more than average degree. In many aged people the dangers from the infection of bronchitis can be diminished by prophylactic injections of mixed vaccines, given in the early fall, once a week for 5 or 6 doses, giving 3 or 5 minims of a vaccine in which 1 M bacteria is contained in 1 c.c., and in 5 days repeat the injection, increasing each time 2 or 3 minims until at the last dose the patient is taking 12 or 15 minims.

Pneumonia in the aged is a terminal infection in many individuals, and it is always a serious condition in any person over 50, although 50 is not the period that one should designate as of old age.

The therapeutics, however, of this condition will be definitely dealt with by another confrere. I can but record by own experience for what value it may possess, that of late years, I have found a distinct benefit in using vaccines in pneumonia, and in some 500 patients thus treated in those who were 50 years of age, the death rate in the treated patients was 33%, while in the controls it was 59%, and for further treatment the circulatory collapses have been best met by adrenalin, giving 10 minims every hour for 6 to 8 doses as the situation demanded.

Although my opinion differs from many of my confreres, I frankly admit that in my hands, and among my patients, alcohol has proved to be a broken reed on which to lean in pneumonia of the young or old, during the acute stages of the pneumonia. In an exhausting convalescence, after any disease, and in cardiac conditions of the aged, as we will discuss later, alcohol is distinctly of benefit, but in the acute stages of pneumonia it has been more of a detriment than a benefit to my patients.

Thewlis in his excellent book on Geriatrics emphasizes the manifold diagnostic enigmas which chronic uremia

and intestinal intoxication produce in old people. The irascibility, the lack of co-operation, the unmanageable difficulties of getting along with old people, are often due to their unfortunate inability to rid themselves of their decomposition products, whether their diet may be right or excessive, or whether their intestinal tract may remain over loaded, and improperly cared for, or whether with increasing chronic nephritis they may be unable to excrete the detritus that has formed in their every day existence. The skin of the aged is hard to make perspire, and they are therefore diminished in their ability to rid themselves of their detritus through this emunctory. For that reason, an abundance of water to flush out their kidneys, and the necessity of purging them with something more than is their habitual amount, is often a necessity, and their symptoms diminish when this is done. Often much of the pains in their joints and muscles, and their headaches, and often their dizziness come from this same lack of proper excretion.

I have left until the last the most important discussion of all, for on it depends the continuation of the existence of old age, that is of the heart and circulation, for one cannot speak of pharmacology in the aged, and leave this subject untouched. Many of the processes of old age are due to a hypothyroidism, and also to the diminution of the secretion of the adrenals. Iodides and iodine stimulate the thyroid, and the general nutrition of the body is greatly increased through a thyroidal stimulation. The thyroid acts alike on circulation and kidney function, improving them in many instances, so that in considering any discussion of circulatory improvement, and in the prevention of the steadily increasing circulatory degeneration of old age, one must take this form of medication into account, and it seems to be increasingly evident that the judicious use and interplay of iodine on the thyroid, with the use of adrenal medication will help much in the retardation of circulatory degenerative processes in old age. Excessive high tension from spasm of the arterioles is not normal for old age, and the layman's idea that his blood pressure

should be his age, plus 100, does not hold good. To control the systolic pressure if one must, attention to the intestinal putrefactions does much to relieve this symptom, and of these medications we have already spoken. If necessary for emergencies, one can control the hypertension through nitrites, and in many instances, with small doses of chloral, and in emergencies of cardiac conditions, the aged bear well chloral and the tinctures of opium. The two drugs that will make an impression on the diastolic pressure are chloral and aconite, i.e. chloral in 3 grain doses, tincture of aconite in 3 to 5 drops every 3 to 4 hours, but neither of these should be continued over long periods of time, and high diastolic pressure points distinctly to a nephritic involvement. In studying the effects of intestinal fermentation, or of the hypothyroidism with spasm of the arterioles, it is the systolic pressure which is raised, rather than the diastolic, and when the diastolic is above 120 the reflexes from the kidney are the usual cause.

Old custom and traditions have taught us to look at the heart and circulation as if separate from the individual, as if to be treated as something apart, forgetting that the injuries to the circulation from the ills and diseases affecting the rest of the body, really produce the degenerations and infections which cripple the heart and circulation, or end the life of the aged. As the processes of senescence come on, the diseases of the heart are more vascular and myocardial than valvular, hence aortitis and coronary disease with the anginal pain, are more frequent in senescence than in old age. But in old age acute myocardial degeneration from intercurrent infections is an ever present danger, and from the danger of a coronary thrombosis an aged person is never free. Many non valvular diseases of the heart show no evidence of their presence to the stethoscope, and one must be willing to accept the evidence of reflex nature that does not seem to be related to the heart, and yet arises therefrom. Coronary disease often is expressed in the form of so-called gastric or intestinal dyspepsia, with which the patients feel not only an epigastric sense of discomfort, but even pain. Sometimes there is a sensa-

tion of fullness, causing a slight dyspnœa. On exertion the dyspepsia increases, and the dyspnœa is ascribed to some asthmatic peculiarity, or simply because the pain is located in the wrist, or in the piegastrium, and around the ribs it is not believed to be cardiac.

Many of the pains of alleged rheumatism are really the beginning of anginal pain. Statistics actually show that the pains of coronary disease are over twice as commonly present in the epigastrium, as radiating down the arms, or in the chest. There is a real danger to many a patient in the presence of epigastric discomfort and a so-called dyspepsia, or with the general weariness and fatigue brought on too easily from the ordinary duties of life. Exercise and golf are not the best remedies, as exercise seems at times to hasten the occurrence of the thrombosis.

In these coronary diseases of the heart, the small doses of adrenalin, or of the adrenal gland produce improvement. The iodides also here have long been acknowledged to be of use, not necessarily the potassium iodide, if it disturbs the stomach, but some form of iodine in non disturbing form. In the old days Lugol's tincture used to be given in 3-to-5-drop doses, colloid iodine to-day is an excellent remedy in 3-to-5-grain doses, once or twice a day. There is a remedy prepared here, called adrenal residue, which contains small doses of adrenalin, this either in the powder or pill form as prepared now, or in the 10 per cent. solution in doses of 10 to 20 drops relieves the coronary pain, relieves the dyspepsia, and improves the cardiac circulation by dilating the coronaries. Ansep has shown conclusively that the coronary circulation is improved and increased by adrenalin. This same adrenal residue will also help control the pain of the definite anginal attacks.

Caffein, on the other hand, while it does increase the coronary circulation, and does increase the power of the systole, shortening it, and strengthening it, poisons in some way the myocardium, and is one of the most frequent causes of extra systoles, and of paroxysmal attacks of either fibrillation or extra systoles. I not only refer to

caffein here as a drug, but also to it as the strong, pleasant beverage that most of humanity depends on for its stimulation and daily cheerfulness, but of which old age must sorrowfully and reluctantly diminish the amount which it can enjoy.

The interesting and invaluable cardiac statistics brought out by Drs. Cohn and Wyckoff, show that humanity comes to dispensaries and hospitals complaining with increasing frequency of diseases of the heart, up to the age of about 65, and then, although the mortality from cardiac diseases goes on increasing in later years as old age goes on, oddly enough neither in clinic nor hospital do these patients come in complaining of their hearts.

There has been an increasing realization among the profession, as emphasized by Dr. Reilly of this city and others, that these patients appear in hospitals and clinics, and noticeably in private practice for the care of intercurrent infections, as colds, bronchitis, etc., diarrhea, colitis, whatever it may be, but the acute myocardial degeneration brought on by the infection, added to their chronic myocardial degeneration, is the infection from which occurs the break down of the circulatory equilibrium, and the patient coming in for intercurrent disease, really dies a cardiac death. Here again the pharmacology of the aged cardiac is that of the careful attention to and treatment of seemingly unimportant intercurrent diseases of old age; they are of great danger to the aged myocardiums, and the earlier the treatment begins, the more likely may one save the myocardium from an acute injury which may be fatal. In the chronic cardiac conditions of old age there is no question but that alcohol in its daily use relieves spasms in arterioles, and improves the capillary circulation, and thus the equilibrium of the circulation as a whole; alcohol improves digestion when taken in small amounts, and is a remedy of great value in the cardiac conditions of the aged. One is not forced to use it only in forms of whiskey, brandy, or the time honored beverages in which we are accustomed to think of it, alcohol acts as alcohol as long as

it is present in any solution, and pure 95 per cent. alcohol is easily added to some bitter tonic as simple bitters of gentian with Calasaya, and can be given after meals, and will be just as effective as if it had been written out on a special blank with the special procedures at present in vogue.

In treating the chronic myocardial degenerations, the question of the use of digitalis is sure to arise. As it was pointed out long ago by Balfour, small doses of digitalis will act as a tonic in these cardiac conditions, it is not necessary to digitalize your patient to the limit of what that patient can stand. It is extremely interesting to note the difference in the patients, that a few drops of the ordinary tincture of digitalis will make; I have seen patients who improved on and took readily, and with great benefit 5 minims of digitalis 3 times a day, but in whom 7 minims, 3 times a day were too much, and smaller doses than 5 minims were insufficient to maintain a good equilibrium. Often a few drops of the tincture of digitalis given once a day, or every other day, may be sufficient, but small doses of digitalis in many of these aging hearts is of great tonic value. Added to that, the tincture of nux vomica given to patients who have senescent hearts, or who suffer from angina, will often improve their circulation, and their digestion. More than this in the pharmacology of cardiac diseases I must refer to my confreres, for I have already trespassed on their domain.

Mere pharmacology is not interesting unless it be connected with a definite clinical subject, and to other papers I must refer the rest. For example in old men we are certain to be faced with the problems of prostatic care, but that has become such a speciality that I have not touched upon it. Often the mere management of the aged is better than all the drugs you can obtain, and patience, and the willingness to listen to the many ailments of the aged who feel neglected, and are unhappy, is often of more value than any remedy. In the care of the aged also, one must be careful not to treat them too vigorously with med-

ication, nor on the other hand push them into bed ridden invalidism. Weary youth and middle age improve in bed, but as Thewlis emphasizes, old age further degenerates in bed, and should be allowed, or even be made to rise from it as much as possible.

There is no question, however, that to the aged cardiac, and to old men in general, the French dictum holds true, that the greatest dangers to an old man are too good a cook, and too young a wife, and no truer words were ever spoken, but that is not pharmacology.

ALCOHOL AND OLD AGE [1]

SAMUEL W. LAMBERT

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Sound wine revives in Age the heart of youth,
While poor wine acts the other way, forsooth.
Pure wine on all refreshment will bestow,
In brain and stomach cause a cheerful glow,
And stagnant currents force anew to flow.
'Twill all depressing, carking gloom remove,
Sharpen the mind and also sight improve;
Quicken the ear and the whole body nourish,
And cause old age with youthful bloom to flourish.

—*Regimen Sanitatis Salernitanum.*

The physiology of alcohol has been proved in the laboratory. It is a sedative to reflex irritability: it is a dilator of the peripheral blood vessels and in this way it can relieve strain on the muscle of the heart and improve the circulation although it is not a direct cardiac stimulant. It is also a depressant to the central nervous system for it permits rest and sleep and relieves thereby the sense of discomfort and restlessness due to the discomforts of disease. It stimulates the secretions of the salivary glands and the gastric juice, it improves the peristaltic action of

[1] Delivered October 4, 1928.

the stomach and upper intestine, and thereby especially improves digestion. It is a food ready for oxidation that requires no further change to be available although it cannot be stored up in the body for future use as can other foods. It must be oxidized at once in the tissues or it will be excreted as taken into the body. Its caloric value as a food is high ranking bulk for bulk second to the fats. One gram of protein or carbohydrate is equivalent to four calories; one gram of alcohol to seven; and a gram of fat to nearly nine calories. An ounce of alcohol represents 217 calories and the investigation of Mellanby shows that a healthy person can oxidize under the most favorable conditions of laboratory experiment some four ounces of alcohol a day without causing any symptoms of intoxication. This is equivalent to 868 calories. In practice, however, half of this or about 425 calories can be easily taken by a healthy man under the ordinary methods of eating. This will supply about one fifth of the energy necessary to a man weighing 150 pounds. Alcohol is absorbed rapidly, it is excreted by the lungs and kidneys in about 2 per cent. of the amount taken in ordinary medicinal dosage. Even when taken in excess never more than 10 per cent. of the amount taken can be excreted before complete oxidation has been finished.

In febrile diseases alcohol in view of the physiological actions just enumerated relieves thirst and moistens the dry tongue and lips. It protects tissue waste in all patients who are not able to digest and metabolize the ordinary proteins, carbohydrates, and fats of their regular food in sufficient quantity to supply the normal demands of their body activities. In the aged and in sufferers from chronic diseases, alcohol is an appetizer and helps to digest other food. In severe cases of those in the last stages of cancer, and in the cachexias of other chronic ailments which present in an exaggerated degree the condition of pathological physiology characteristic of old age, alcohol is often the only food which the diseased stomach can retain and absorb. Alcohol in the form of malted liquors such as beer and stout is a stimulating tonic and frequently

is the least harmful of all soporifics for the neurasthenic and nervous patient. Fermented liquors form a most useful tonic and food in convalescence from prolonged infections and from severe surgical procedures. Alcohol is not a direct heart stimulant, but indirectly by its action on the peripheral vessels and directly as an antidote to the chronic poisoning of the heart from overindulgence in coffee and tobacco, much is gained in the treatment of man which is not discoverable in the laboratory of the pharmacologist. Alcohol by its rapid absorption without the necessity of previous digestion, by its action to increase the amount of blood circulating in the capillaries of the skin which have been dilated by its use, gives a feeling of distinct warmth and comfort to the aged. By its similar action on the blood vessels of the brain alcohol in moderation quickens the cerebral activity and gives the imagination a freer play, while it inhibits the higher functions of the intellect and also checks the excessive activity of the logical faculty. It furnishes a quickly oxidizable food and relieves fatigue after exertion of mind or body more quickly than any other food. It reduces the tendency to brood over the inevitable accumulation of years beyond three score and ten. The individual feels less despondent and is able to endure the lessened activities of the mind and the inertion of his aging tissues with a greater equanimity.

I hasten to deny that I am advocating drunkenness for anyone although I may be accused of it. The claim that alcohol is toxic in all doses is put forward as a strong plea for the intemperance of teetotal abstinence. This is absurd for the normal brain gives a reaction in persons who have taken no alcohol exactly the same as the brains of the man dead of acute alcoholism. The amounts found in teetotalers are so small that it is not quite certain whether the reaction is due to true grain alcohol or to some allied chemical substance. The inference that normal metabolism forms alcohol and uses the same in the combustion of food products is a fairly accurate one although the difficulties of absolute proof have not yet

been successfully overcome. Dr. Gettler of the Laboratory of the Medical Examiner's Office in New York is at work on this problem, but has not as yet been able to offer more than a probable answer to this question. It is Dr. Gettler's professional duty to analyze the bodies and especially the brains of all persons who are certified as dead of alcoholism and of those in whose case alcoholism is recorded as a complicating condition of their death.

The physiology of old age represents as compared with that of the healthy adult individual a slowing down of all the processes of life. Mental activity is less active, digestion is slower and hampered by a diminished secretion of gastric and other digestive juices, muscular activity is weakened and excretion is diminished. This picture cannot be measured in years. Some people grow old between the ages of 50 and 60, others do not grow old until after they are 80 years of age. The gradual fibroid changes in the heart muscle and in the blood vessels is the most prominent factor which brings about the physical changes in the cells of the glandular organs which have to do with the chemistry and metabolic processes of life. In discussing the action of alcoholic beverages upon the human organism in the processes of increasing senescence, the greatest emphasis must be placed upon the effect on the circulation, on the digestion, and on the chemical processes going on in the muscles. It is customary to refer to the action of this group of food products entirely in terms of their alcoholic content, and the subject given to me to discuss is "Alcohol and Old Age." It is almost never that pure grain alcohol mixed with varying amounts of water is given for internal medication to any human being. The reverse is true when one considers the result of laboratory experiments which are conducted with grain alcohol only. Wines are never wasted upon the rabbits and guineapigs of the laboratory, and the action of wines and beers and also of well-aged liquors are something more than that of mere diluted alcohol. The wines in particular contain other derivatives from the result of fermentation which can neither be quan-

titatively analyzed nor duplicated in synthetic manufacture. Alcohol and water is a disagreeable drink in any dilution. Whiskey or brandy mixed with water is quite the reverse to most palates, and the wines are the most agreeable of all. The action of a well-flavored wine which may contain anywhere from 8 to 15 per cent. of alcohol is felt by one partaking of it as soon as the beverage is taken into the mouth. Its agreeable aromas stimulate appetite and increase the secretion of the salivary glands. Its action on the stomach is similar. It causes an increased flow of blood to the stomach wall and increased secretion of gastric juice, and does so to some degree whether the previous secretion from the stomach was normal or lacking in the digestive ferment and a normal amount of hydrochloric acid. The taking of wine with a meal therefore increases the desire for food and improves the nutrition. The wine itself requires no further digestion and is almost the only food product which will be absorbed from the stomach itself without further preparation or delay in its reaching the capillaries of the tissues. After absorption by the blood vessels it is carried to every part of the body without detention in its passage through the liver. Arrived in the glandular and muscular tissues most of it is immediately oxidized supplying energy and in so far as it is oxidized, protecting and conserving the other sources of energy supplied by fats, carbohydrates and proteins of food. If the tissues are supplied with more alcohol than can be immediately used it passes through into the veins and a certain amount is excreted by the kidneys and lungs and thereby removed from the body. The remainder is held in the cell itself for short periods of time prior to further oxidation and the production of energy or its excretion later. Dr. Gettler in his analysis of brain placed the amount of alcohol present in the brain without any pathological symptoms as varying from 2/100 to 1/10 per cent., that anything over this amount would begin to give cerebral symptoms, that the beginning of intoxication and loss of equilibrium in walking began at one quarter of one per cent., and that a dangerous point of poisoning was

reached at over 4/10 of one per cent. It has been shown that a healthy man can digest and oxidize from seven to ten cubic centimeters of absolute alcohol per hour without poisoning symptoms or any signs of intoxication. This means that a healthy man can handle in the neighborhood of ten ounces of whiskey during sixteen hours during which he is awake but that in order to do so it must be taken in evenly distributed dosage through the whole day. Of course, such a use of a beverage is impossible and it has been found that this theoretical four and a half ounces of absolute alcohol is too much if taken in the ordinary manner of use of beverages and food. Half this amount or two ounces of absolute alcohol which is equivalent to about four ounces of whiskey or to a pint of wine of 12 per cent. strength represents the maximum that a healthy person can absorb and oxidize. This maximum measure in whiskey would represent about two and a half pints as the maximum quota for a healthy man in ten days. When applied to old age there is a very great difference in the individual capacity to oxidize alcoholic beverages just as there is a difference in the capacity of younger persons to convert this form of food into energy by metabolic combustion. It is most exceptional that any person over 60 years of age cannot handle with advantage to his digestion and to his nutrition some quantity of a good sherry, port or claret during the twenty-four hours. The form of beverage which shall be used is entirely one of individual peculiarity depending partly on taste and partly on the physiology of the body.

As compared with wine and distilled liquors the question of the use of malted beverages should be considered. Beer is distinctly nutritious entirely apart from its alcoholic content which averages about 4 per cent. Beer is distinctly sedative and hypnotic apart from its alcoholic content because it contains an extract of hops. If the individual is suffering from certain diseases such as an active inflammation of the kidney alcoholic beverages may possible prove harmful. If the individual is a victim of true gout certain beverages may increase that ten-

dency and bring on a pathological condition. Certain other beverages on the other hand may prove a benefit in the elimination of acute poisons. George Saintsbury Regius Professor of English at Cambridge University wrote some years ago an account of the wines that he had owned and had enjoyed. He called his little volume "My Cellar Book." He wrote it at the time that his cellar was empty and it was empty because with advancing years he had proved to himself and to his physician that he could no longer enjoy these beverages. In that book he sums up the whole situation of the use of alcohol as an addition to the foods in the diet of every day. He says if a man can not drink without harm to himself he is a fool if he does so, but that if he can enjoy wine he is a bigger fool if he does not.

When it comes to the treatment of the circulation itself, to influencing the hardening arteries of the general system and particularly the coronary arteries, the use of alcohol in old age has a very specific value. It is a dilator of the peripheral blood vessels. The quick energy which it furnishes to muscle is shared in by the muscle of the heart and there is no question but that a little wine "for the stomach's sake" represents a real therapeutic result and is an action not on the stomach but on its nearest neighbor, the heart. The thickening arteries of old age result in the much advertised and talked of condition of high blood pressure. High blood pressure in itself is not a serious symptom. It only becomes of importance when the greater obstruction to the passage of the blood from the large arteries to the tissues of the body is no longer overcome by an efficient and sufficiently powerful action of the heart. The use of alcohol equalizes such a circulation by giving extra and rapidly usable energy to the heart muscle and by dilating the blood vessels to reduce the peripheral obstruction and lessen the demand for power on the heart itself. The pharmacologists insist that alcohol is a depressant of the higher nervous centers and it is probable that such a depression of overexcited mental activity is a great help in relieving nervous anxieties which

become exaggerated in old age as a result of worries and family jars and differences of opinion which may be more imaginary than real but which nevertheless are a cause of many symptoms of a physical nature. Several of the group of symptoms known to the laity as a skipping or thumping heart which are due to extrasystoles probably dependent on myocardial lesions of slight pathological significance are helped by the use of a dose of some alcoholic beverage taken regularly with meals. The symptom of palpitation also can be benefitted in many instances whether due to organic change in the myocardium or to emotional cause. These arrhythmias in the aged are more alarming to the patient than of real serious nature but their control or removal is of real therapeutic value in making these patients more comfortable and more able to lead useful lives.

But it is when we come to that severe symptom complex known as angina pectoris that the use of alcohol is of the greatest value. The anginas which depend upon a true lesion of the myocardium are benefited by the sense of well-being which alcohol induces, by the relief of the anxiety and pain of the attack itself as well as of the worry and apprehension of the interval between the attacks, but there is no doubt that the use of brandy and the stronger alcoholics has a very distinct effect to restore an equalized circulation by removing the disturbances which usually accompany angina pectoris. Other drugs such as the nitrites and stronger dilators, the analgesics including morphine are not contra-indicated during the use of alcoholic beverages. The effects of the other poisons which are habitually used by man as part of his daily life are not as useful to him in his old age as is the much abused alcohol which is now under the ban of the reformer and the taboo of the Constitution. Tobacco is a help to many. Its effect makes for an improved enjoyment of life. Tobacco, however, in cases of increasing myocarditis can easily prove a potent cause of anginal attacks. Coffee and tea may frequently be the exciting element which brings on extrasystoles and the cardiac arrhythmias. In these cases the

use of alcohol will benefit and may remove the symptoms possibly only with a needed reduction in the daily consumption of tobacco or coffee, and not their entire elimination. One of the effects of prohibition with its elimination of a rapidly oxidizable food in the daily life of the American public has been a marked tendency of everyone to turn to the next easily oxidizable food that is available, and since prohibition the consumption of sugar in the United States has increased tremendously. As a result the strain on the pancreatic function has been markedly increased and diabetes has become a more prevalent disease. This is shown by the death rate from diabetes which in spite of the discovery of insulin by Banting is still increasing. Diabetes is not a prominent disease in the aged although there are many cases which develop as age advances, but it is particularly true in the diabetes of old age that alcohol has a useful and prominent place in the treatment of the disease. A recent writer ascribed the increase in diabetes as being due not to the influence of prohibition but to the increase of fat Jewesses in the Land, but in my opinion it is more a question of the toxicity of the increased sugar intake by the whole population than a problem of race or of sex.

Alcohol as a beverage presents an entirely different problem from alcohol as a drug, but it must never be forgotten that it is only in beverage form that alcohol can be used as a drug. A United States District Attorney recently wrote in his brief upholding the law prohibiting physicians from using their own judgement as to the amount and kind of alcoholic beverage which should be prescribed in the treatment of disease that physicians had no cause to complain, that if they wished to give such a medicine to their patients the law would permit them to use pure grain alcohol so medicated as to be unfit for beverage purposes, that they could use without limit any of the patent medicines which are sold freely in the market, that they could send their patients to a hospital where unlimited quantities of alcoholic beverages were permitted as a drug although the hospitals thus excepted by law are those es-

pecially chartered for the cure of alcoholism, or he may use any preparation of the pharmacopeia which contain a sufficient quantity of alcohol. It is a great therapeutic suggestion that physicians should turn to Tomah Joe's Medicine or to Saphronia Ely's Remedy for their prescribing of a useful and necessary medicinal agent. It is impossible to argue on this subject with a reformer who has turned his attention from the control of the alcoholic problem and the saloon to the compelling of total abstinence on everyone, the invalid as well as the drunkard. Everyone agrees that the saloon is bad, but nearly everyone is now convinced that the speakeasy is worse, and in fact it is impossible to get upon a common ground for discussion. The reformer thinks only of drunkenness and debauchery, and the physician thinks only in terms of moderation, temperance and medicinal values for the normal person and of inebriety and excess as a pathological condition of mind.

In the referendum conducted by the American Medical Association in 1920 answers were received from some sixteen thousand physicians who were asked whether whiskey, beer and wine were necessary to the practice of medicine. The referendum was worded not with reference to the usefulness of alcoholic beverages, but the extreme question was put as to the necessity of these drugs. A majority of the physicians recorded their answers that whiskey was a necessity, that wine and beer were not. It cannot be denied that all three are useful and yet nevertheless so high an authority as the Supreme Court of the United States has based its decision on the assumption that it is a fact that beer has no medicinal value which is not possessed by whiskey, and that a pint of whiskey every ten days is a reasonable amount to permit for the medicinal use of one patient. This permits to a single patient an ounce and a half per day. So far at least as the aged are concerned, to say nothing of the usefulness of alcohol in acute infectious and febrile diseases, a pint in ten days barely permits half of the desirable quantity that may be used with advantage. An effort was made in this City to establish the unconstitutionality of this part of the Volstead

Law. This effort in the Courts has failed and if the medical profession is to re-establish its right to prescribe what drugs it will in what doses it deems sufficient it must do so by a concerted effort led through its great organization to wring from Congress a proper, logical, and just law and to relieve itself from the public stigma now placed upon it of being bootleggers and panderers to human frailty and intemperance.

It is quite customary in this Country to accept the decisions of the Supreme Court as final and without question. In the case of the decision rendered by a vote of 5 to 4 justifying the legislation embraced in the Volstead Act it is interesting at least to look more intimately at the opinions rendered by the majority and minority of the Court. Mr. Justice Brandeis representing the majority of the Court gave the following reasons to justify the enactment of the prohibitions of the Volstead Act: "The Court further held that Congress must be regarded as having concluded—as it well might do in the absence of any consensus of opinion among physicians and in the presence of the absolute prohibition in many of the States—that malt liquor has no substantial medicinal qualities making its prescription necessary; and that this made it impossible to say the provision was an unreasonable and arbitrary exercise of power.

"We have spoken of that case at length because the decision was by a unanimous court and if adhered to disposes of the present case. If Congress may prohibit the manufacture and sale of intoxicating malt liquor for medicinal purposes by way of enforcing the Eighteenth Amendment, it equally and to the same end may restrict the prescription of other intoxicating liquor for medicinal purposes. In point of power there is no difference; if in point of expediency there is a difference, that is a matter which Congress alone may consider. Experience has shown that opportunities for doing what the Constitution forbids are present in both instances, and that advantage not infrequently is taken of these opportunities. Congress, in deference to the belief of a fraction of the medical

profession that vinous and spirituous liquors have some medicinal value, has said that they may be prescribed in limited quantities according to stated regulations, but it also has said that they shall not be prescribed in larger quantities, nor without conforming to the regulations, because this would be attended with too much risk of the diversion of the liquor to beverage uses. Not only so, but the limitation as to quantity must be taken as embodying an implicit congressional finding that such liquors have no such medicinal value as gives rise to a need for larger or more frequent prescriptions. Such a finding in the presence of the well-known diverging opinions of physicians, cannot be regarded as arbitrary or without a reasonable basis. On the whole, therefore, we think it plain that the restrictions imposed are admissible measures for enforcing the prohibition ordained by the Eighteenth Amendment."

It is practically said that the physicians differ in opinion and the medicinal liquor may be diverted to beverage purposes, and that an implied finding by Congress is sufficient ground on which to base the constitutionality of a law. The best answer is found in the minority opinion written by Mr. Justice Sutherland as follows: "It is said that high medical authority is in conflict as to the medicinal value of spirituous and vinous liquors and (hence it would be strange if Congress lacked power to determine that the necessities of the liquor problem require a reasonable limitation of the permissible prescriptions. This observation does more than beg the question—it indulges an assumption the exact contrary of that which the record conclusively establishes, for the limitation of quantity is not only unsupported by any legislative finding that it is reasonable, but it is in flat opposition to the only facts appearing in the record which bear upon the question of what is a permissible prescription and, therefore, is without rational basis, resting alone upon the arbitrarily exercised will of Congress. I do not see how it can be held otherwise without completely ignoring the case as made and constructing and considering another and different case.

"Nor is the opinion of the majority aided by the long list of state enactments cited to demonstrate that the present statute is not arbitrary, for, since the control of the medical practice is outside the province of the federal government and wholly within that of the States, *Linder v. United States, supra,* the powers of Congress in that field are not to be assimilated to those of the states."....
"I do not doubt the authority of Congress to regulate the disposal of intoxicating liquors for medicinal use so as to prevent evasions of the law against the traffic in such liquors for beverage purposes, and to that end to surround the prescription by the physician with every appropriate safeguard against fraud and imposition, but as this record now stands it cannot prohibit the legitimate prescription of spirituous and vinous liquors for medicine as this statute attempts to do. "Federal power is delegated, and its prescribed limits must not be transcended even though the end seem desirable." *Linder v. United States, supra, p.22.* Because this statute by fixing inadequate prescriptions prohibits to the extent of such inadequacies the legitimate prescription of spirituous and vinous liquors for medicinal purposes, it exceeds the powers of Congress, invades those exclusively reserved to the States, and is not appropriate legislation to enforce the Eighteenth Amendment. The decree below should be reversed."

An individual case under the Volstead Act is being enacted at the present time in this City. A well-known physician has had a book for the prescribing of alcohol prescriptions ever since they were required. It has been his custom to enter on the spaces of that book that the medicine is ordered for "medicinal purposes," or "medicinal," and he has refrained from placing on record the name of the disease from which his patient suffered. His book having run out in July it was ten weeks before he could have it renewed because he refused to disclose the names of the diseases for which his patients required the medicine whiskey. After a rather sharp correspondence his contention was supported and the book was issued. This experience has occurred to him periodically every time a new book

was requested. Since the issuing of the book inspectors have called at his office and have demanded to see his records in order that they may know for what diseases he is prescribing. The physician has refused to show them his book on the ground that although the law requires that the alcoholic beverage should be prescribed only for some known disease it is not the business of the Government to be informed concerning the private affairs of the patient and that the physician is required and privileged not to divulge such affairs personal to anyone except for the detection of crime and conviction therefor. It would be a wise thing if more physicians should take a decided stand in this matter and get relief from the exasperating and inquisitorial methods. A paternalistic and imperialistic government method should be checked now before worse and more stringent endeavors to pry into personal affairs between the physician and the patient should be put in force. Organized medicine has been reluctant in coming forward to influence Congress for the passing of proper laws. The Courts have decided that the present situation is constitutional and that relief must be had from Congress, and I personally hope to see a more active campaign for relief coming from the profession as a whole. It is no longer fit that physicians should carry this important question personally to the courts of law in order to protect themselves and their patients in their rights.

I shall close with an opinion of alcoholic beverages of some 250 years ago. In one of the books concerning old age "Via Recta ad Vitam Longam," published in 1660 and now on exhibition in the library, Tobias Venner of Bath, England, wrote in praise of whiskey as follows: "Usquebath is a kinde of Aqua vitae, and in Ireland of great use, which in regard of the moistnesse of the aire and Country, is very proper and healthfull for the Inhabitants: for it notably strengtheneth the stomack for concoction, discusseth winde, concocteth and dissolveth crude and flatulent humors, causeth phlegme to be expectorated, reviveth the spirits, expelleth melancholy, and mightily fortifieth the whole habit of the body, being taken the quan-

tity of a spoonfull or two after meals, or at any other time when the stomack shall be ill affected.

"Although Usquebath, be of little use with us, yet in the Winter season, or any other cold and moist time, the moderate and orderly use thereof may be of great consequence for supporting a vigorous state of body: for if it be well made, you shall scarcely meet with a more strengthening and cordiall liquor; but it is most convenient for the aged, and for them that are of a cold and moist constitution of body, and in the cold seasons of the year."

THE AGING OF THE HUMAN BRAIN[1]

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In discussing such a subject as the Aging of the Brain, certain limitations should be made clear at the outset. In the first place, there are some illusive aspects to this problem concerning which one opinion may appear as valid as another. In the second place, the material at present available for a complete and satisfactory solution of the question is insufficient in amount and otherwise inadequate. And finally, no authoritative statement in the matter at this time seems possible from the evidence in hand:

What I shall have to say expresses a personal point of view, an interpretation and application of the facts as I see them. You may differ with my opinion totally or in part, which is as it should be in such a debatable and open question.

When this subject was proposed, my first reaction was one of hesitation and considerable resistance. My own interests have been on the other side of the ledger. Problems concerning the growth and development of the brain, its further utilization in behalf of more adequate human adjustments, have made a strong appeal to me. I am not

[1] Delivered October 9, 1928.

especially attracted by the question of the brain's decline and decay. This stage savors too much of cheerless finalities in the autopsy room, of futile and fading days of life in the homes for the aged and infirm.

Then I asked myself the questions: Who has ever seen a strictly old brain? What does it look like? When does it first begin to show the signs of age and why does it grow old? Thus far I have not found the answers. In fact, old age itself in many ways appears to be an institution of human making. It is not recognized in the natural world about us. Here the race is and always has been to the strong, the vigorous, the alert, the competent, regardless of age. To falter is to invite destruction; to weaken and fall is to die. In the wild, animals enfeebled by injury, disease or age are shown no quarter. Beast, bird and reptile, each has its natural enemy, never far distant and always ready to take advantage of failing power. Sudden destruction, awaiting all alike, saves them from gradually waning vitality, from progressive disease, from a long and tedious process of death. Nature's mercy works swiftly.

Man, out of his rich endowments of sentiment, struggles earnestly to prolong deficiencies which nature prescribes, to cultivate inadequacies which nature forbids.

In the strict biological sense old age seems to be an exclusively human institution based either upon disease, upon a mental attitude, or upon both of these together. By morbid changes of the tissues, old age may claim the young long before their time, just as a buoyant and determined human spirit may resist the ravages of years long beyond the allotted three score and ten. Many human records bear proof of this valiant resistance against the mental attitude of old age. I know of no more telling instance than that of the Turkish gentleman who, as recently reported by the Associated Press, has attained the astonishing age of 154 years. This is achievement enough by itself. But in addition, he has just successfully divorced his eleventh wife in order that he might take unto himself

a twelfth.[2] Who would venture to assert that this much varied century and a half of human life has yet succeeded in producing an aged brain?

One difficulty in dealing with the problems of old age is our statistical ingenuity. Our time limits for the span of life are narrowly conceived. If they pragmatically justify the rule of averages, they overlook the vital significance of striking exceptions. If they actually accept old age as a corrolary of life, they inconsiderately neglect certain causes underlying the process of growing old. It may not be denied that decay and death are implicit to life. On the other hand, the slow or sudden appearance of dissolution is due more to circumstance than to any fixed chronological schedule. This is surely true of the brain.

From what we now know of the causes underlying senescence, in the light of many striking exceptions, I should prefer to consider the so-called aged brain as one which has been diseased, abused or neglected. According to this point of view, mental old age has a pathological background. It arises from definite conditions which may be combatted or corrected. As it is, the senile brain already has a well established reputation. Its literary record may be less picturesque than that "Last scene of all which ends this strange eventful history sans teeth, sans eyes, sans taste, sans everything."

To common experience this time of life is known as second childhood. Psychological technique has reduced it to more exact terms, has measured it in units of failing memory, waning concentration, wavering attention with a strange tenacious dwelling upon things long past. The brain of old age has been even further labelled for identification. Certain features which stand out upon its surface have been recognized. These features with all the meaning of tell-tale crows' feet about the eyes, of deepening lines upon the face, announce that such is an old brain, and such

[2] *N. Y. Herald-Tribune,* Aug. 12, 1928, front page; Constantinople Associated Press.

are the structural appearance of its antiquity. In brief, this is what the brain of an old man is *said* to look like: Its surface is wrinkled and shriveled. Its wasted convolutions have a coarse appearance and feel hard. Their surface is unequal and granular. The fissures separating the convolutions are deep and gape widely. The sub-arachnoid space is filled with a large amount of fluid. The cavities of the ventricles are dilated and their walls have a granular appearance. Along these walls are calcareous incrustations, small plaques and superficial softenings. In many old brains there are partial adhesions between the ventricular walls, forming pseudomembranous bridges. Most of this marked wasting of the brain is found in the anterior two-thirds of the organ. There is much reduction in the gray matter and some also in the white.

Pierre Marie has described a condition which he calls "l'etat vermoulu," or worm-eaten state. It is limited to the gray matter of the cortex, particularly in the temporal and orbital lobes. This occurs only in aged people. Madame Dejerine has recognized this state frequently in old brains and found that it rendered many of them improper for histological study.

Not only does the brain itself show these changes. Its covering, the pia mater, is thickened and infiltrated, and the walls of the blood vessels constricted or thickened.

At this juncture it is fitting to introduce the black mark of the aged brain, namely, the senile plaque. Although Alzheimer (1906) was not the first to observe these plaques of the aged, he definitely associated them with precocious senile dementia. Several years later Perusini confirmed this observation and gave to the condition known as presenile dementia the name of Alzheimer's disease. Fischer also studied these peculiar badges of old age. But he concluded that normal old people are quite free from those stigmata which are characteristic of senile dementia only. Fischer called them mycotique sclerosis and believed them to be due to some obscure spirochetal infection.

Now, however, comes a categorical investigator, Simchowics, who is willing to stake all on the senile plaque as the identifying mark par excellence of the aging brain. He believes these pathological spots in the cortex are a sure sign of normal old age. The range of his investigation included brains from 75 to 104 years of age. Up to 75 years in normal people these tell-tale signs of decline were not found. This exemption strikes a most reassuring note. It produces valid evidence that old age may keep its withering touch off of the brain long beyond the proverbial three score years and ten. In aged persons after 80 years, a few senile plaques appeared. But this is not true in all octogenarian brains. After the 90th year these plaques of age were always observed. This fact seems to set the actual threshold of old age at the 90th year. The evidence from the brain, at least, points strongly in this hopeful direction. In old people after the 94th year there was a goodly number of senile plaques, while in one old gentleman of 104 they appeared in great number. Although this mycotique sclerosis appears also in various forms of senile dementia, it is the distinguishing feature of the normal old brain. The spots are said to be the lesions characteristic and typical of the senile gray matter and are more numerous than any other lesions encountered in old age. It is for this reason that Simchowics has called them senile plaques, wishing in this way to make clear that they are special attributes of the senile brain. These lesions are scattered in very old normal subjects and in senile dementia, throughout the brain, but they appear in greatest number in the frontal region. They do not occur in the cerebellum or in the spinal cord.

The number of these plaques constitutes not only a symptom of importance from the standpoint of differential diagnosis; it is also an index of the intensity of the involutional process in the senile brain. If we admit that the number of plaques is a sort of senile index of the different regions of the brain, it may be possible to produce a senile formula of the entire cortex in question. Pursuing this idea, Simchowics has constructed a mathematical

expression which aims to give the degree of senility represented by any brain. This formula is quite different in simple, uncomplicated old age from the formula in presenile and senile dementia. During physiological atrophy of the brain, the plaques increase very slowly in number, for a period of 20 years or more. The reverse is true in the intensely rapid development of the atrophy in senile dementia, which takes place in a few years.

Thus it appears, from the clinical as well as from the anatomical standpoint, that senile dementia does not differ essentially from the ultimate state of normal old age except in its less rapid development. These observations mean, if they mean anything, that senile plaques are the evidence of disease in the brain not alone in senile dementia but in normal aged people of more than 90 years. The senile plaques thus speak in favor of the view that the old brain is actually a diseased brain.

This interpretation is emphasized by Leri who appears to have given the first concrete description of the senile brain. He asserted that there is no senile organ, and notably no sensile brain, without definite pathological lesions. These lesions may be essentially diffuse and macroscopic. They may be microscopic, scattered and without definite focus. They consist of simple or degenerative atrophy, involving the nerve cells, proliferation of the interstitial elements, sclerotic lesions of the vessels. But all of them, whether large or small, scattered or focal, appear to depend upon an ensemble of intoxications accumulated and sustained during all of the individual's life history. These intoxications are often multiplied in advanced age in consequence of certain organic insufficiency.

The senile brain is always small and atrophied. Its weight and volume are much diminished. The atrophy is predominant in the frontal lobe. The corpus callosum is thin. The septum pellucidum is thin and transparent. The white matter in the centrum ovale and passing among the basal ganglia is reduced in size. The white matter of each individual convolution is decreased. Perivascular dilatations occur and "l'etat crible." Even the cerebellum

may take part in this atrophy but never to the same degree as the cerebral cortex. The nerve cells upon which depend all of our higher mental activities are atrophied but not in proportion to age. Often many healthy cells remain in subjects of advanced years. Nissl's bodies begin to disappear; a mild degree of chromatolysis is present. Strongly developed lipochrome degeneration of the brain cells is characteristic in elderly people and indeed, a general tendency to an increase of intracellular pigment. Many varieties of pigment granules occur, which have usually been described under the name of yellow pigment. They seem to be derived one from another and represent successive stages in the process of degeneration. Many of these cellular alterations do not differ essentially from changes observed in consequence of prolonged intoxication, like chronic alcoholism, uremia, or lead poisoning, quite apart from old age. The nerve fibers in the aged brain are diminished in number. This is especially true of the radial fibers extending outward into the gray matter of the convolutions. The transverse fibers are equally diminished, notably the fibers of Tuczek. This is a lesion which appears particularly in the dementias. Degeneration of myelinized fibers is apparent by simple atrophy, sometimes by abnormal coloration and rarely by the formation of granular bodies. The amyloid bodies frequently appear as the result of segmentation of various axis cylinders. The genesis of the corpora amylacea is not clearly understood. Myelinized fibers disappear and thus explain the atrophy of the white substance. The neuroglia cells in some areas appear to be increased in number, but this change is relative in consequence of the actual diminution of nerve elements. Some of the neuroglia are apparently neuronophages. The proliferation of the neuroglia fibrils determines a senile sclerosis more or less pronounced. The blood vessels almost invariably show sclerotic changes within the brain, not, however, in proportion to the atheromatous lesions of the basal arteries. The arterial lesion often involves all coats of the vessels. More rarely it is an endarteritis, a peri-arteritis or a mesarteritis. Lesions

of the capillaries are infrequent. Perivascular sclerosis is a common occurrence, particularly in those parts most poorly vascularized. Miliary hemorrhages often occur in senile brains and may be independent of miliary aneurisms. Small multiple foci of complete softening in or immediately below the senile cortex, areas of lacunary disintegration, small regions of cavitation and large areas of softening and cerebral hemorrhage, are all observed in the brain of aged people.

Senile dementia is probably nothing more than a condition, in much more pronounced terms, of normal senility, due to that common anatomical process of toxic origin causing disintegration in nerve cells and nerve fibers. Thus Leri, from his anatomical studies of the brain in old age as well as from clinical observation, was led to conclude that there is a close relation between the changes caused by old age and those produced by prolonged intoxication. All of this is a strong argument in favor of the theory which holds old age in the brain, as in other organs, to be the result of life's successive and cumulative intoxications.

No evidence thus far adduced is sufficient to convince us that there is such a thing as a strictly old brain. The brain in aged people may present certain morbid changes, but these are in their turn incident to many pathological assaults upon the tissues sustained during life which, in some individuals more, in others less, are in all alike the consequence of infections, intoxications or other morbid influences.

Now we may view the problem from still another angle. The theme of old age, in its more exact sociological aspects, has long received earnest and serious attention. As a matter of general human interest it has been an absorbing topic, even from classical times. Less than half a century ago one of the most effective studies of this subject was carried on under the direction of Dr. George Murray Humphrey, with the assistance of the Collective Investigation Committee of the British Medical Association. The

minimum age of subjects in the inquiry was fixed at 80. Information was received concerning nearly 900 persons who had attained the age of 80 years, including 74 centenarians. Of those who had lived for 100 years or more the record is astonishing not alone because of its numbers, but because of the decisive way in which these people who had successfully completed their century run, had pushed backward and held away at arm's length the blighting devastations of growing old.

The estimates made at that time by the Registrar General indicated that there was one centenarian to about 127,000 persons. If these figures still hold good, there should be in our own country to-day 866 old people who have attained or exceeded the great age of 100 years.

Among the centenarians of Humphrey's report the intellect is said to have been high in 11 and low in 5 only. In the vast majority of them some degree of memory was retained. As many as 39 had a good memory for past events and as many as 26 out of this 39 had the freshness in recollection indicating a good memory for recent events. Seventy-five of these centenarians retained a fairly good memory, while 50 per cent. had a memory with essentially no defects. The intellect in 10 per cent. was entirely preserved and in only 5 per cent. was it completely lost. One of these old people could quote a good deal of the Bible. Another could repeat one hundred psalms correctly. Many of them were remarkable for mental and bodily activity and energy throughout their long lives. Not a few of them had engaged in strenuous toil and active mental work in various occupations and in different ways. They had labored effectively almost to the very end of their long drama which they reached in much better condition than Shakespeare would have us believe to be true of that seventh and last stage of all. Humphrey notes that in this record of extremely long life, women preponderate over men. He believed it to be due in great measure to the relative immunity of women from exposures to which man is subjected. Woman's greater temperance in eating and drinking may also bear decisively upon this age predominance.

Of 824 old people between the ages of 80 and 100 years, 73 per cent. possessed an average amount of intelligence and mental capacity up to the end of their long lives. Twenty-one are said to have been of unusually high intellectual capacity, and only 5 per cent. were rated as low. The history and statistics of all these aged people from 80 to 100 years and more, clearly demonstrates how persistently the brain may resist the harsher inroads of time and maintain itself in its dominating position as the chief executive organ of life far beyond the usual limits of existence.

Such notable instances as these make it seem probable that those fortunate enough to escape or avoid the ordinary hazards of life may carry a healthy brain far into a green old age. Those who fall by the wayside are the victims of accumulating pathology or accident.

In still another way we may obtain a first-hand acquaintance with the brains of old age. It is possible to judge quite fairly of its qualities and characters from the activities and mental capacities of centenarians and octogenarians . What does the brain itself show in these very late periods of life? Several brains of people who lived for a 100 years or more have been studied postmortem. Although the number is limited, it does none the less shed considerable light upon this subject of brain old age.

Dr. Humphrey has given us the post mortem records of people who lived for 100 years and over. His first report is a premier in many respects for the brain of Thomas Parr was not only the oldest ever autopsied, being 152 years and 9 months, but the examination of it was made at the command of Charles I., by Dr. William Harvey, famous for his discoveries of the circulation of the blood. Parr was a farm hand. Even as late as his 130th year he engaged in all kinds of agricultural labor. Up to that time he retained sufficient strength to thrash corn. All of his viscera were sound with the exception of the spleen which was very small. The brain was healthy, firm and hard to the touch.

Dr. James Keill reported on the brain of John Bayles of Northampton who was reputed to have lived to 130 years. His body was emaciated and all of the abdominal viscera pale. There was some ossification of his dura mater in the region of the falx cerebri. The brain was more solid and firm than usual and the ventricles were full of serum. (*Philos. Trans.*, 1706, 25.)

As described by Rolleston, the brain of John Pratt was said to be 107 years old. (*Scientific papers and addresses*, 1, 111). This man's mother lived to be 104 and his grandmother 110. His habits were reported to be something short of strictly temperate. The dura mater was closely adjacent to the skull. The canals of the meningeal arteries were deepened by bands of bone upon either side. The brain weighed 43 ounces. (Rolleston mentions another brain which he had removed from a woman 140 years old weighing 45 ounces.) The convolutions were rounded and to some extent atrophic. The fissure of Rolando and the fissure anterior to it were wider and deeper than natural. The ventricles were somewhat enlarged. Numerous amylaceous bodies appeared on the surface of the corpus callosum.

The brain of Dr. Holyoke, a physician aged 103 years, was also reported by Rolleston. In this brain the cerebral fissures were considerably widened and filled by hydrocephalus in vacuo (a marked increase in cerebrospinal fluid in the subarachnoid spaces).

Humphrey reports a personal examination of the brain of a woman reputed to be 103 years old. The brain was shrunken; the fissures wide and occupied by subarachnoid fluid (hydrocephalus in vacuo).

Weighing the facts contained in the reports of these five elderly people, it is at least clear that even in advanced years the brain may retain much of its normal appearance and present but a slight degree of that shrinking commonly ascribed to old age. It should be borne in mind that this same decrease in size of the cerebrum has like-

wise been observed in younger persons wasted by long illnesses, in habitual drunkards, and in others suffering from various organic diseases. Only one of these five brains is referred to as showing much shrinking in its convolutions. To offset this is the reassuring fact made on the great authority of William Harvey that the brain of a man 150 years old was healthy, firm and hard to the touch. Taking the evidence obtained from these centenarians for what it is worth, recognizing both its fragmentary nature and its limited extent, we may conclude that in some cases at least the human brain has the vitality to go a considerable distance beyond the 100 year mark and continue to be an efficient organ.

In recent years the brains of many who attained the age of 80 years or more have received postmortem study. Among these are men famed for intellectual achievement of the first order. Many of these famous octogenarians carried on their mental activities almost to the last days of life.

Professor Ernst Haeckel, noted the world over as the propounder of the Biogenetic Law of Recapitulation, and a profound biological student, died in his 86th year. His brain showed some of the senile changes which might be expected in advanced years. It was a large brain and highly convoluted in its frontal and occipital lobes.

Theodor Mommsen, the great German historian, philologist and jurist, died in his 87th year. The examination of his brain at postmortem showed that the vessels at the base of the brain were markedly sclerosed, with areas of pronounced constriction. The entire right side of the cerebellum was softened. Numerous areas of softening appeared in the right hemisphere and quite a number in the left. The largest of these appeared in the frontal lobe and measured 3 cm. in diameter. The remaining focal softenings were small, and apparently older, as they had a yellowish tinge. The brain was markedly edematous over the frontal convolution. The gyres seemed somewhat small and the fissures long and deep. The brain of this

aged scientist was definitely pathological. The morbid changes were due to marked arteriosclerosis with multiple areas of infarction. Some degree of senile atrophy was observed in the convolutions of the hemispheres. This might well have been the result of the extreme vascular disease.

Professor Robert Wilhelm Bunsen died in his 89th year. His chief contributions were in the field of inorganic chemistry, but in the truest sense of the word he was one of the greatest discoverers. In Bunsen's brain the inner surface of the dura was adherent. With the exception of certain anomalous relations in the lateral ventricles, no pathological conditions were found other than a moderate degree of senile atrophy.

It is known that both of these learned men pursued their high intellectual interests well on toward the 90th year. In both of them senile atrophy was present. Mommsen, however, showed distinct changes in the blood vessels as well as evidence of thrombosis, while the slight degree of diminution in size observed in Bunsen's brain would hardly justify calling this brain senile.

The brain of one of the most engaging of modern intellectuals, satirist, critic, philosopher, theologian, historian and politician, has recently been studied. Anatole France died in his 81st year. He remained mentally active almost to the close of life, writing his last book one year before he died. The beauty and lucidity of his style are well known, yet what gave him his greatest influence upon modern times was that wide range of learning which he had so completely at his command and which appeared so inobtrusively throughout his works. At the outbreak of the Great War he was in his 71st year. Too old to serve in the field, he desired at least to show his good will and asked for work in a Government Office at Tours. He was revered in his old age as a genius and a patriarch.

The brain of this illustrious literary master was unusually small (1017 grams). Even allowing for a certain diminution in consequence of age, the brain of Ana-

tole France was much below the mean average of adult brains for this time of life. The investigators who studied this remarkable cerebrum were impressed not by the presence of atrophy in the convolutions, senile or otherwise, but by the remarkable complexity of the convolutional coils and fissures. These were most complex in the frontal and occipital lobes which were described as comparable to the finest pieces of jewelry work ever produced.

It is difficult, if not impossible, to decide from the evidence derived from aged brains exactly what an old brain should look like. The testimony in some cases speaks in favor of a certain degree of shrinking in the convolutions with a real loss of brain substance. Equally prominent instances are cited to indicate that the brain may go a long way toward 100 years and even beyond this mark without showing much of those signs habitually associated with the aging process. It is not at all certain that such appearances as have been ascribed to the aged brain are not due to mild pathological lesions acquired in consequence of previous disease during the course of life.

One may be unwilling to deny that there are essential brain changes due to senescence. It might, however, be difficult to establish an impregnable argument to support this position. Indeed, it seems more reasonable to assume that the changes of old age in the brain are variable, that they vary in the time of their appearance, in their extent and their severity. A brain is not necessarily senile simply because it is 95 years old. Its possessor may be active and alert in the business of life. But if such a brain bears in addition to its burden of years the effects of disease, it is sure to give proof of failing function in direct proportion to the gravity of the pathological lesions.

Old age of the brain is much more often the result of disease than of some inherent aging process. There can be no cavil or dispute concerning the part which disease plays in the actual aging of the brain. In the vast majority of human beings whose mental processes show the enfeeblement of age, it is disease, not years, which has

altered their brain and caused the waning of brain power. It may be that the disease is due to some inherent metabolic process, the nature of which is still altogether obscure. Such are the mysterious conditions in which old age seems to begin in the very cradle and rushes the course of life through a few brief years to its conclusion in extreme senility. Progeria with its uncanny process of swift aging has this result. It appears in early infancy. It rapidly produces senile decrepitude before the child has had an opportunity to pass through early youth. Every organ and tissue of the body at length manifests the signs of extreme old age. Progeria may be somewhat delayed in its first appearance, sometimes beginning as late as the first or second decade of life. But once established, it rapidly sweeps its victim through the various stages of involution.

It has been maintained that this process is due to a persistent infantilism which has none of the potentialities necessary to maturity. The span of life is abridged and old age follows directly in the footsteps of infancy without the intervening stages of growth and development. It is perhaps too early yet to offer an opinion concerning the nature of this mysterious spectre of old age in infancy. It has many earmarks suggesting that it is a condition due to disease.

Apart from such strange disorders as the one just mentioned, factors of disease which produce aging of the brain may be clearly seen. All of those morbid influences which alter the efficiency of the body as a thoroughly coördinated machine, which compromise the efficiency of its metabolism, which cripple one or more of its essential departments, which enforce upon it the need of compensatory activity to meet the bare necessities of life, have their embarrassing effects upon the tissues of the brain. In the course of years they become cumulative to the increasing disadvantage of cerebral activity. All of those causes which impair the efficiency of the circulatory system, which alter the consistency of the arteries, which decrease the effective-

ness of hemal exchange, which impair the venous return, which increase or decrease circulatory tension, exert their baneful influences upon the most highly organized tissues of the body, the brain.

Of late years we have become acutely conscious of the effects of a devastating epidemic whose results are most manifest in the brain. This organ as a result of epidemic encephalitis, which we believe to be an inflammation of infectious origin, is changed in many ways. Often times the inflammation produces many signs of old age converting young and healthy persons into decrepit and feeble patients with many of the handicaps, reactions and appearances of senility. Thus we have, in actual experience, encountered a disease which prematurely produces a close resemblance to old age. This great epidemic has opened our eyes. Nature has performed an extensive series of brain experiments from which we may draw new conclusions and see many things concerning the brain in a new light. We are beginning to realize that the central nervous system, the brain in particular, is much more frequently the victim of infection than we had previously supposed. It is not unlikely that many minor illnesses which heretofore we have passed by lightly, have taken an unsuspected heavy toll in depriving the brain of its vital resistance.

Poisonings of many varieties influence the brain unfavorably and facilitate the development of pathological processes. With many of these poisons we are familiar. We know what alcohol, both good and bad, will do to the brain. We know how many are easily poisoned in this way. Year by year we see the increasing effects of such poisoning upon the brain. Arsenic, lead, antimony, mercury and many other toxic substances of which we know, have a similar poisoning effect upon the brain. Many poisons generated within the body itself are also injurious to the brain. Some of these we know. In the main, however, we have barely scratched the surface of the vast subject dealing with toxins either encountered in our com-

plex human contacts or generated within our own bodies. In fact, it is amazing how little general or particular interest man has shown in the most important organ of his body and life. Up to the present time he has devoted relatively little attention and much less capital to the understanding of that part of his machinery which is the secret of his success and the only hope for his future progress, if not his actual salvation.

For diseases of the brain we may be able to excuse ourselves. Our all too feeble efforts have not yet put in our hands the control of or mastery over brain diseases. During the course of life we are surrounded by innumerable and invisible enemies. We hold our place in existence by grace of that tenacity of life inherited from ages of biological existence before us. In some respects we have improved our mode of life, but in many others our lack of knowledge still leaves us almost as defenseless as when our race began. Our present ignorance may be a valid excuse because the attainments of knowledge are relatively new and science is the youngest child of brain development.

There are many other causes of diseases for which we may more justly be reproached. The general principle underlying this group of causes may be summed up in a single word—intemperance. This inevitably leads to abuse. Such abuse is due either to wilful disregard of recognized facts or unnecessary ignorance concerning them. Thus, for example, the use of all intoxicating substances the poisonous effects of which are well recognized, is an abuse. It is above all else an abuse of the brain. The disregard of recognized hygienic principles essential to the best mental life is equally an intemperance which results in abuse of the brain. One of the most prevalent forms of disease today, one creating the greatest economic waste, is the so-called nervous breakdown in business and professional walks of life. These disorders are, if anything, on the increase. They are all alike encouraged in their development by excessive demands upon nervous energy and brain power.

All excesses in life which expose the brain to undue strain sow the seeds of disease or prepare the soil for pathological changes. Such abuses may be corrected. The way of going about it brings up many questions. Sumptuary laws and other like regulations might be suggested as a cure. But prohibitions are seldom successful in such corrections. They represent another form of intemperance which often gives rise to abuses worse than the original evils they were intended to control. Wisdom based on exact scientific knowledge, broadly inculcated and widely disseminated, offers the only sure promise of overcoming that intemperance whose harmful influence upon the brain we already understand.

If a large proportion of the change called senile is due to disease or to abuse, such a thing as a strictly old brain must be rare. In time we may learn to control disease and overcome abuse. When that time arrives, geraphobia, the fear of old age and the old age complex, need no longer have their place in the list of human ills. Such a day is still a long way off. Much must be accomplished, much must be changed before its coming. If ever we succeed in bringing about such changes and achievements, we may reasonably expect, among other things, an actual increase in the span of life. We may hope to see a new age not merely of reason but of wisdom. All of this may be most difficult to attain. It is more than worth the struggle. It entails a mighty investment of capital and effort for the further conquest of disease. To continue this work, as yet but feebly begun, is a national and international enterprise. It is not the exclusive concern of medical academies or medical centers. It should be the business of the entire people. They will enjoy the profits; they must be the chief investors.

In the matter of our mental attitude toward old age, progress is also needed. The later years of life should no longer be regarded as the time for retirement, as the days of patient waiting. To grow old gracefully should be to accept old age as the time for which all of the arduous

years of life have been lived. Ripe in experience, rich in the gifts of wisdom, is it right for a man to retire simply because his years are many? Not if he has a brain which is healthy and firm and capable of serving his fellowmen. By proper methods of living and prophylaxis, he may keep possession of such a brain though he be nearing the century goal. Only yesterday we read in the news columns of a United States Supreme Court Justice who is well into his 87th year. With one exception, he has served his country in this capacity longer than any other justice. Great son of a great father! Honored, revered, beloved, he is still serene in his outlook and sure in his judgment.

What a boon it would be to our fellows were we thus able to take into a long, calm Indian summer of life a useful brain, unimpaired by disease, unspoiled by abuse.

Some day governments and people will awaken to the fact that they have been missing the greatest constructive opportunities.

The ridiculous stupidity of annually consecrating appalling sums of money to the savage purposes of destruction should in time shock human intelligence out of patronizing such futilities and into wiser realizations. The present neglect of constructive programs, especially programs in behalf of further developing the machinery of intelligence, is deplorable.

Certainly, one liberally supported and effective brain institute would prove an incomparably more profitable investment for civilization than the most powerful battle fleet that ever sailed the seas. The political party which will have the foresight and humanity to introduce into its platform an article advocating and supporting the longer and better use of the human brain will offer a worthy issue to its electorate.

THE MECHANISM OF SENESCENCE[1]

(ABSTRACT)

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During the summer, I devoted a considerable amount of time to the preparation of a paper on the Mechanism of Senescence which I intended to read this evening. However, I shall refrain from doing so for two reasons. The first is that in the last few years we have learned so much about the biology of old age that it would take altogether too long to discuss it tonight in the short time at my disposal. The second reason is that in reading the very interesting and complete program of the Graduate Fortnight, I discovered that an important subject had been omitted. There are, I believe, forty-seven speakers to deliver addresses before you. None of us has thought that the fundamental condition for studying old age is to define and measure it. As already emphasized by Mr. Dublin, it is certain that physiological age is not the same as chronological age. The number of years during which a man has lived bears no definite relation to his real age. This is due to the fact that each human being is different from every other human being. We are the result of our heredity, environment, diseases, and psychological experiences, and we can say without any fear of being mistaken that, since the beginning of the world, there has been no individual exactly like another individual. Therefore, it is quite natural that the passing of time affects every one of us in a different way.

In the study of senescence, we must know the physiological age of the patient, because his chronological age is misleading. If it were possible to establish the curve of aging of an individual during maturity, the probable course of his life could, in some measure, be foreseen. The role played by physiological senescence and pathological proc-

[1] Delivered October 3, 1928.

esses could be ascertained. The value of artificial rejuvenation would also be determined. It is assumed that by grafting testicles or stimulating old ones, rejuvenation can take place. But neither Steinach, Voronoff, nor any of their followers have attempted to verify whether their methods of treatment have brought about a real rejuvenation. After a man of, for instance, sixty years has undergone a testicle transplantation, it should be ascertained if he has been restored to the age of fifty-eight or fifty-five or fifty. This is the only way to decide whether or not the treatment has been successful.

How can we find a method for measuring age? There are several possible ways of doing it. As Claude Bernard taught long ago, cells and humors are intimately connected. Any change modifying one of the components of the system necessarily affects the other. Therefore, tissues or blood serum are equally valuable witnesses of any important organic modifications. The progress of age can be ascertained by the measurement of the residual energy of a fragment of tissues extirpated from the body. But this would not be practical when human beings are concerned, unless some significant change could be discovered in the behavior of the white blood corpuscles. Another possibility, which is also impractical for human beings, is to measure the rate of healing of a wound. In some experiments made during the War, du Noüy found that there is a precise relation between the size of a wound, its index of cicatrization, and the age of the patient. When the area of a wound is measured at four day intervals, and the index of cicatrization calculated according to du Noüy's formula, the age of the patient is determined if located between the years of twenty and forty-five. These experiments were made on practically normal individuals, soldiers otherwise in good health, and the results were surprisingly exact. But the technique is difficult, as the wound has to be kept strictly aseptic, without being irritated by an antiseptic. It appears that the only possible method for measuring old age must be based on certain physiological and chemical modifications which occur in

blood serum. During the course of life, blood serum undergoes a progressive change, and becomes more and more inhibiting to the growth of colonies of tissue cells. This is a significant phenomenon, and can easily be measured. The technique is as follows:

Blood plasma is taken from an animal and the cells are removed by centrifugation. The effect of serum is then tested on a pure culture of fibroblasts. Each culture is divided into two halves. One is cultivated in a saline solution and the other in the serum which is to be studied. For a few days, the surface of the growth is measured. The ratio between the growth in serum and that in saline solution is called growth index. The value of the growth index is equal to unity in a dog a few weeks old. It rapidly decreases as the animal grows older. In a dog of three or four years, it may be about 0.3. It reaches a value less than 0.1 in animals of 10 or 11 years. Through the changes in the growth index, the curve of aging of a given individual can be established. This curve at first slopes down very quickly. The process of aging is very rapid at the beginning of life, as Minot showed long ago. But toward the end of life, it takes place very slowly.

This technique is still far from being precise. It does not supply us with an absolute value of the age. But it allows us to follow the process of aging in a given animal. If rejuvenation can be produced, there is no doubt that through the measurement of the growth index of serum before and after the operation, its detection would be possible. Imperfect as it is, this method supplies us with the means of determining an important change brought about in the organism by the process of aging. This is the essential basis of a scientific study of old age.

THE AGING OF THE HEART MUSCLE REGARDED FROM A GENERAL BIOLOGICAL POINT OF VIEW[1]

(ABSTRACT)

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Let us first review the theoretical background without which a discussion of the processes of the aging organism is difficult and indeed incomprehensible. While the average expectancy of life at birth has increased substantially during recent years, the expectation of life in the later decades has not increased. Whether seventy years is to be regarded arbitrarily as he average anticipated span of life cannot be decided without further investigation.

For the body to become weak, for the heart and indeed all the tissues to become desiccated and to undergo the many other chemical and physical changes which are easily conceived to be necessary if the equilibrium of the forces and substances which are involved is to be maintained in harmony, is the natural result in the aging organism. How long the span of this process may be, whether and how much it may be extended, experience does not yet tell us. But of one thing surely there may be certainty; this process cannot be prevented by any means so far discovered. The hope which is held out in this direction seems bound in some sense to be frustrated. Of far greater usefulness is the effort by whatever hygienic or other means to provide an environment in which the aging process may be accomplished to its best and most undisturbed advantage.

The study of man will, I believe, go forward best when it is related to the main stream of biological thought. Against this background it becomes easier to understand what variety of phenomena must be investigated in order to understand better the diseases so called of old age.

[1] Delivered October 3, 1928.

With improvement in hygiene, more and more people come into the position of realizing their natural and allotted span of years. For this reason the structures which appear to bear the brunt of the stress of life are the heart and the blood vessels. I say 'appear to bear this brunt' because medicine and physiology, being still youthful sciences, find it useful and easier to think in mechanical terms. It is not that other organs and tissues are not also exposed to wear and tear but that the mechanical stress of the heart and circulation is obvious. Types of affection of the heart were involved in the complaints of men of advanced years, such as thrombosis of the coronary artery, angina pectoris, and pain of other and not yet well defined causes.

It has been my object to emphasize the fact that human beings are growing creatures. Their anatomy and physiology cannot be described completely if the description is made to apply to a selected period of life. Growth is a continuous process, always in the throes of change, constantly exhibiting new and altering phenomena until the phrase 'the child is father of the man' takes on new meaning. Child and man are indeed two distinct individuals. If their natures are different, so are the ills to which they are liable, and so the remedies which it is the high function of medicine to bring to their relief.

COMMITTEE ON MEDICAL EDUCATION

Extract From a Report of the Sub-Committee in Charge of the Graduate Fortnight

"Believing that our experience may be of some value for the next Graduate Fortnight, the following suggestions are herewith submitted:

"The topic for the next Fortnight might be chosen with a view to making the annual Graduate Fortnight not merely an effort of scientific contribution but also to prepare for the place which the Academy might occupy in the leadership of medical progress in the widest sense of the word. The changes which we may reasonably expect in the future of medicine concern less the gaining of new scientific discoveries as their distribution through channels which will reach practitioners quickly and effectively, and they concern even more those mechanisms which will establish the science and practice of medicine as a social factor. In individual and public hygiene of all sorts, preventive as well as constructive, the medical profession must receive the intelligent cooperation of our commonwealth, financially and otherwise, and therefore it seems to your committee that the Academy has an unusual opportunity of fostering enterprises which will more and more link together social leadership with the leadership in scientific medicine. With these thoughts in mind it is felt that a subject would be the more useful the more it attracted, aside from the medical profession, social workers and all those interested in public welfare. A subject which would lend itself particularly to this purpose would be one that covered the field of functional diseases in the borderland of medicine, neurology and endocrinology, and reached into every branch of medicine and surgery. The field includes all those functional disturbances which have been much neglected in the last thirty years in comparison with the structural disturbances of the human body. Because of this and for other reasons it has become the happy hunting ground of all the 'isms' and cults in our country and organized medicine can do no better than to occupy

this field and make it the center of interest in such an enterprise as the Graduate Fortnight, with some such title as, 'The Mind and Functions in the Problem of Human Diseases.' Such a topic would cover differential diagnosis of functional and organic derangements in all branches of medicine and surgery. It would also include the topics of neurasthenia, neurosis, psychoneurosis, and of mental hygiene in its widest meaning. It would give an opportunity to invite outstanding leaders of public welfare to participate in our Fortnight."

THE DIAGNOSIS AND TREATMENT OF PREPARALYTIC POLIOMYELITIS [1]

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In considering the poliomyelitis problem account should be taken of the possibilities in regard to prevention of the disease. Measures directed toward this end can come only from an understanding of the chain of circumstances which make for the occurrence of the disease. I should like, therefore, to review briefly some phases of its epidemiology in order that we may have a clearer understanding of the procedures which should be employed in our attempts to alleviate the distress caused by this not very common, but none the less alarming disease.

I need not dwell upon the evidence that the disease is caused by a filterable virus, that class of infectious agents which differ widely from bacteria in their morphological, cultural and immunological characteristics, nor need I stress the evidence that the disease is transmissible. Experimental evidence relating to ingress and egress of the virus through the upper respiratory passages indicates the likelihood that the disease spreads by contact and is in

[1] Delivered before the Section of Medicine, October 16, 1928.

accord with the theory that the virus spreads largely through persons not actually sick with the disease. Limitation in the procedure necessary for the detection of the virus has not permitted anything approaching a real survey of the distribution of the virus. Perhaps partly for this reason and because of the lack of evidence ordinarily sought to establish contagiousness, that is, the occurrence of the disease amongst those associated with the sick, there has been much speculation concerning some more or less mysterious origin of the disease.

Evidence of another sort giving a quantitative idea of the mode and extent of the spread of the virus is found in an analysis of some of the general epidemiologic features of the disease. Correspondence between the age distribution phenomena of this disease and that of measles and diphtheria, the mode and extent of spread of which are readily measured—in measles by observance of actual attacks of the disease and in diphtheria by the occurrence of the clinical disease, the carrier state as shown by culture, and immunity as indicated by the Schick test—affords evidence, indirect but none the less convincing, that the virus of poliomyelitis spreads with the same rapidity and probably to the same extent as the virus or organism of these more common contact diseases. In the epidemiologic sense measles is perhaps the simplest of the transmissible diseases. Everyone is susceptible. Opportunities for infection are so great that everyone contracts the disease relatively earlier or later in life depending upon the facilities for contact (concentration of population) and is thereafter immune. The result is that the age distribution of measles at a given time is in a sense a measure of existing immunity from previous attacks of the disease. This interpretation of the age distribution of measles is in entire accord with such observations as the equal susceptibility of persons of all ages when measles is introduced into an isolated locality previously free of the disease, and with the simple observation that practically everyone develops measles in the course of a life time. That the age distribution phenomena of diphtheria is likewise due to im-

munity, although only approximately 10 per cent. of individuals develop clinical diphtheria, is now demonstrated by the Schick test. That the organism of diphtheria spreads with equal rapidity according to concentration of population and produces immunity corresponding in extent to that of measles is shown by its identical age distribution phenomena. The essential difference in the mechanism involved is that in the case of diphtheria immunization is accomplished in the majority of instances without the occurrence of the clinical disease, as is now well known both by the Schick test for immunity and from the occurrence of the organism as shown by culture in individuals who have not passed through an attack of the disease.

Since poliomyelitis possesses the same characteristics in regard to age distribution as these two more common diseases, the mode and the extent of spread of which are now beyond dispute, it seems clear that the virus of poliomyelitis must be disseminated by the same mechanism, giving rise to a similarly widespread immunization, in the course of which the recognizable disease is produced in a relatively much smaller proportion of individuals actually attacked by the virus. This conception of the extent of the distribution of the virus of poliomyelitis is further borne out by observations regarding the age distribution, seasonal fluctuation and relative frequency of the disease according to climate. As in the case of diphtheria, there is evidence, for example, that the diminution in the occurrence of poliomyelitis as warmer climates are approached is due more to a variation in the frequency with which the virus causes the recognizable disease rather than to any reduction in the extent to which the virus spreads. In fact one sees indications in such studies that the occurrence of the disease (either individual cases or epidemics) may in reality be assigned more to some alteration, either local or general, seasonal or climatic, in what may be termed physiologic resistance (as distinguished from immunity in the strict sense) rather than to any variation in factors relating to the virus.

These observations concerning the extent to which the virus spreads and the evidence they afford in regard to susceptibility to the disease now permit a clearer insight into many of the phenomena of the disease which on the surface have not appeared to be in accord with the idea of contact infection, such as the relative infrequence of multiple cases in families, the spread of the disease in institutions and the comparative rarity of the disease amongst those immediately exposed to the sick.

In view of the experience with other diseases, the organisms of which spread by contact, measures designed to curtail the spread of the virus of poliomyelitis do not offer any very great hope for the control of the disease. It may be said further that even though some test be devised for the detection of susceptible individuals, there is as yet no practically applicable method of immunization.

For the present, then, one turns to the field of treatment as a possible means of affording the greatest relief from this serious disease. Much has already been accomplished in the surgical correction of deformities following poliomyelitis. This effort has now come to be directed more largely toward the prevention of these crippling secondary effects of the disease. But such measures can only serve to preserve or improve whatever function may remain after an attack of the disease.

From the very nature of the lesion causing paralysis, at least so much of it as proves to be permanent, it is obvious that whatever means are attempted to prevent nerve cell destruction should be applied before this irreparable damage occurs. Fortunately this does not take place without warning. In the vast majority of cases the occurrence of paralysis is preceded by a definite and characteristic train of symptoms known as the preparalytic stage. While the extent of the occurrence of what has been called abortive poliomyelitis is not known, it is generally believed that many of the mild febrile attacks occurring in the vicinity of known cases of the disease represent a generalized infection with the virus of poliomye-

litis. Since the symptoms are not unlike those of other acute infections, there being no involvement of the central nervous system, a definite diagnosis is not possible with the means at our disposal. As distinguished from the abortive form, the preparalytic stage of poliomyelitis, whether followed by paralysis or not, is characterized by signs and symptoms of meningeal involvement. The patient is taken sick with fever, headache and a gastro-intestinal disturbance, which usually consists of vomiting and constipation. Drowsiness and a desire to be let alone are also frequently observed. While these symptoms are fairly constant, the absence of one or more does not rule out the disease, and they are not characteristic enough in themselves to warrant a diagnosis. It is, then, the physical signs to which one must look for diagnosis and these make the early picture of infantile paralysis a fairly characteristic one. On observation the child seems prostrated to a greater degree than the temperature, which is usually under 102 F., would indicate. The face is flushed, the expression anxious, and there is frequently pallor about the nose and mouth. The throat is mildly injected, but not enough in itself to account for the child's condition. The pulse is usually rapid out of proportion to the temperature. The rest of the physical examination is negative, except for that portion which deals with the nervous system. There is frequently a rather coarse tremor when the child moves, which may be very striking. There is a distinct rigidity of the neck; however, this is not as marked as that usually seen in meningitis. The patient tilts the head on the neck, but does not bend the neck on the shoulders. As a result, the head can be brought about half way forward, when resistance is encountered and the child complains of pain. More constant and more characteristic than the stiffness of the neck is a stiffness of the spine. This is best brought out by having the patient sit up in bed and try to bend the head down to the knees. The average child, ill with other infections, is very flexible and has no difficulty in doing this. If these patients bend forward at all it is from the hips, with the spine held rigidly. Many of them cannot

assume a comfortable sitting position without propping themselves up on their arms. Anterior flexion of the spine often causes a drawing pain in the lumbar region. Kernig's sign is not usually marked at this stage, but the deep reflexes are frequently hyperactive rather than diminished, as they are later. A cerebral tache is almost always present. It is the presence of these signs and symptoms which justifies a probable diagnosis of anterior poliomyelitis and calls for the final step in the diagnosis. This step is examination of the spinal fluid. The fluid is usually under only moderately increased pressure (from 150 to 200 mm. of water). Macroscopically the fluid appears to be clear, but when viewed by transmitted light it presents a faint haziness which has been described by Zingher as a "ground glass" appearance. There is an increase in cells, usually between 50 and 250, but occasionally as high as 700 to 800, or as low as 20. These cells may be largely polymorphonuclear early, but later are lymphocytes. There is an increase in globulin; sugar is normal.

Other acute infections accompanied by meningismus may simulate the clinical picture of early infantile paralysis, but usually the cause of meningeal irritation becomes evident on physical examination, while in the event of doubt the lumbar puncture as a rule gives a normal spinal fluid. Tuberculous and syphilitic meningitis or encephalitis may give a spinal fluid which may be confusing; however, the clinical picture and possibly spinal fluid sugar is usually sufficiently different that one may avoid mistakes.

A certain proportion of patients (from 10 to 15 per cent.) give a history of having had a mild gastro-intestinal upset consisting usually of headache, fever and vomiting and lasting only a day or two. In the majority of these cases this occurs exactly five days before the onset of what has just been described as the preparalytic stage of the disease. During this preliminary episode, which we are inclined to regard as a systemic reaction to the presence of the virus, there are no signs or symptoms which would suggest involvement of the central nervous

system. Incidentally, the signs and symptoms observed during this preliminary attack correspond to those sometimes seen in families with frank cases and which are suspected as being abortive cases of poliomyelitis.

The chief difficulty in gaining any idea of the effect of any method of treatment in this early stage of the disease is the entire lack of correlation between any of the manifestations of the preparalytic stage and the extent or severity of the paralysis which follows. Paralysis does not appear in the majority of cases until from 48 to 72 hours following the onset of the preparalytic symptoms. There is, further, no statistical data upon which the frequency of paralysis or its severity may be predicted in cases in which a diagnosis is made in the preparalytic stage.

The epidemic prevalence of poliomyelitis in Massachusetts in 1927 afforded an opportunity for the treatment of a comparatively large series of cases in the preparalytic stage under fairly uniform conditions. It was felt that the inclusion of cases in which paralysis had already appeared would only introduce complication in determining the effect of treatment, in that, according to the lateness of treatment, an increasing proportion of cases would have advanced to a point beyond which there is at least no theoretical advantage in the treatment employed. Since there are no criteria for determining in advance the possible severity of a given case, nor indeed whether or not paralysis will ensue, no attempt was made to individualize the treatment. Our chief aim was to treat a comparatively large number of cases in a uniform way in the hope that the outcome of these cases would be of some statistical value as compared with that of untreated cases. To this end every patient seen by us within the first four days of the disease, who was still febrile and in whom paralysis had not appeared, was treated. The series may therefore be regarded in a sense as consecutive. That we were not dealing largely with a non-paralytic form of the dis-

ease is indicated by the fact that 65 per cent. of the treated cases subsequently developed some degree of paralysis.

Numerous reports appear in the literature concerning the treatment of poliomyelitis by several methods. In many instances the number of cases is small and in some the diagnostic criteria are not given in full and finally the outcome of the cases is not exactly measured nor is the outcome of untreated cases in the same outbreak given for comparison, so that the literature leaves one in doubt as to the efficacy of any of the methods employed.

For the reasons which have been outlined by Dr. Flexner in the preceding address convalescent serum was chosen as the method of treatment. Each case received two intraspinous injections on successive days, an intravenous injection being given on the first day. Twenty c.c. was given as a rule intraspinously on each day and the intravenous injection varied from 20 to 60 c.c., according to the supply available at the time.

In all 106 cases were treated, this representing all cases seen by us during the preparalytic stage in the course of the 1927 epidemic in Massachusetts and comprising approximately one tenth of all cases reported. No cases were included where both the clinical picture and spinal fluid findings were not typical of preparalytic poliomyelitis. Subsequently the paralysis in each case was measured by muscle examination, done by the after-care department of the Harvard Infantile Paralysis Commission. For comparison similar muscle examinations were available on approximately one half of all cases which were reported in Massachusetts in 1927. The five grades of paralysis distinguished in these muscle examinations are based on the power in the affected muscles as compared with a normal muscle. For comparison between groups of cases arbitrary numerical values of 1, 2, 3, 4 and 5, have been assigned to the different grades of involvement, 1 representing only a slight involvement and 5, a total loss of function.

Results

The case fatality rate for poliomyelitis in Massachusetts was 14 per cent. One of the 106 cases treated with convalescent serum in the preparalytic stage died. However, it is believed that at least a part of this apparent reduction in case fatality rate is probably attributable to the fact that in a certain proportion of bulbar cases, particularly those with paralysis of deglutition, the preparalytic symptoms are either very mild or apparently absent, so that such cases might not be included in any series of treated preparalytic cases.

The average paralysis of the three milder grades per case in the treated group was 45, 32 and 26 per cent. of that in the average untreated case. In the two severer grades the average paralysis in treated cases was only 12 and 9 per cent. of that in the untreated cases.

Chart I

Since for obvious reasons it was not deemed practical to conduct a controlled experiment such as, for example, the treatment of alternate cases which were diagnosed in the preparalytic stage of the disease, the apparent result in the serum treated cases is open to the criticism that mild and nonparalytic cases, which ordinarily would be missed, are included. It has already been pointed out that none of the early signs of the disease gives any indication as to its probable severity, nor are statistics available which give any idea of the extent of the occurrence of the milder forms of the disease. It should likewise be pointed out that evidence that such forms of the disease do comprise any large proportion of cases is equally lacking. Thus, the extent to which the inclusion of such cases has influenced the apparent results of serum treatment is purely a matter of opinion. Upon the assumption that the difference in paralysis between treated and untreated cases is due to the inclusion of mild cases in the treated group which were missed in the reporting of cases in general, it may be calculated that there must have oc-

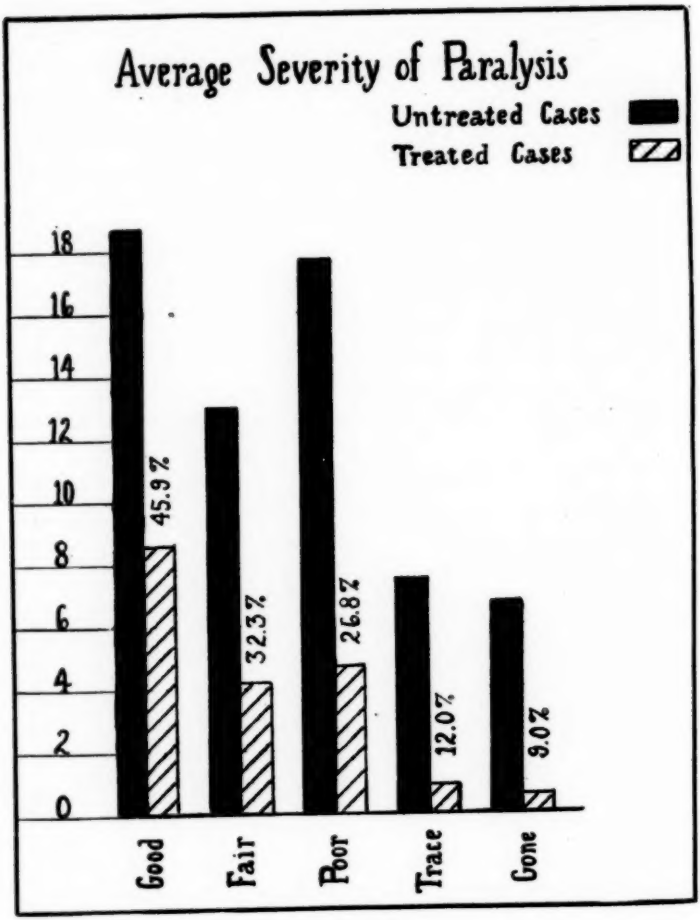
Average Severity of Paralysis
Untreated Cases
Treated Cases
18
16
14
12
10
8
6
4
2
0
45.9%
32.3%
26.8%
12.0%
9.0%
Good
Fair
Poor
Trace
Gone

CHART I.

curred approximately ten times as many cases as were reported.

Chart II

In Chart 2 is shown a comparison between the average distribution of paralysis in the treated group of cases, considering only those treated cases which subsequently developed some degree of paralysis, and untreated cases. All of the treated cases (35 per cent.) which developed no paralysis were excluded on the assumption that they might have represented cases ordinarily missed. The average paralysis in the treated case which resulted in paralysis is then markedly less than that observed in the average untreated case. Carrying the assumption that the apparent result of serum treatment is due to the inclusion of mild cases a step further, a comparison between the average paralysis in the worst one fourth of the treated cases with that of untreated cases is shown in Chart 3.

Chart III

It happens that the worst one fourth of the treated cases show approximately the same total units of paralysis as untreated cases, but the distribution of paralysis in the treated cases is of quite a different order, there being relatively more paralysis in the three milder grades, "good," "fair," "poor," but relatively less in the two severe grades, "trace" and "gone." From the point of view of prospective recovery, then, even the worst one fourth of the treated cases are to be considered of a much less severe involvement when it is borne in mind that something like 50 per cent., 40 per cent. and 30 per cent., respectively of "good," "fair," "poor" muscles ultimately recover while in the two severe grades less than 5 per cent. ever return to normal function.

The conditions existing in Haverhill are of interest in connection with the assumed influence of the inclusion of "missed" cases in the treated group. During the 1927 epidemic 110 cases occurred in Haverhill, a city of 47,000, or 2.3 cases per thousand of population, a rate exceeding that of the 1916 outbreak in New York City. A general

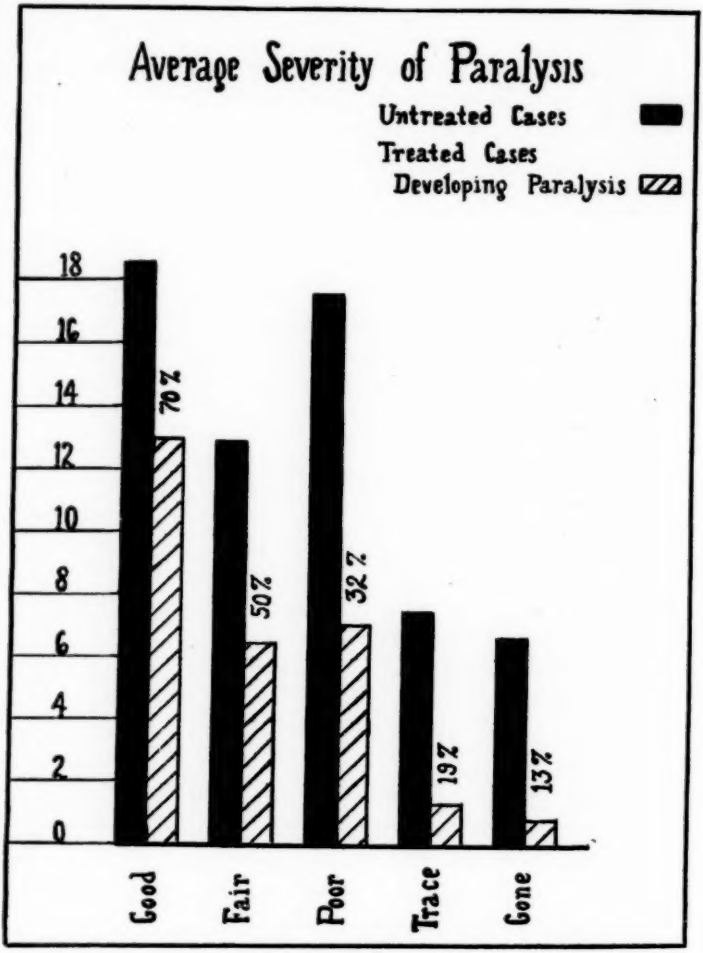
Average Severity of Paralysis
Untreated Cases
Treated Cases
Developing Paralysis
18
16
14
12
10
8
6
4
2
0
70%
50%
32%
19%
13%
Good
Fair
Poor
Trace
Gone

CHART II.

state of alarm prevailed, school and other public places were closed to children. Newspapers carried daily headlines as to the progress of the epidemic. In short, the epidemic was the foremost event in the minds of the public. Frequent meetings of the medical profession were held in which early diagnosis and serum treatment were discussed. Not only was the medical profession thoroughly alert to the situation, but any illness, however trivial, was feared by parents and a physician was called. Such conditions afforded an ideal opportunity for the discovery of "missed" cases. During the epidemic one of us and at times three of us were constantly in the city and had the opportunity of seeing every case of illness in which there was even the remotest suspicion of poliomyelitis. The result was that we saw a large number of sick children, in practically all of whom some disease other than poliomyelitis could be positively diagnosed. There were only a very few cases of mild febrile disturbance which could have been suspected as abortive poliomyelitis. It may be further observed that of the 110 patients in Haverhill fifteen died, a case fatality rate of 13.6 per cent., which does not differ significantly from that of the state at large (14 per cent.). It may therefore be stated that the intensive investigation in Haverhill did not disclose any evidence of the occurrence of a large proportion of "missed" cases.

Conclusion

The difference between the outcome of 106 cases of poliomyelitis treated in the preparalytic stage and untreated cases reported in the same outbreak can only be assigned to either of two factors, the beneficial effect of convalescent serum or the inclusion amongst the treated cases by reason of early diagnosis of a preponderant number of cases of mild forms of the disease but with meningeal involvement which are missed in the reporting in general. The lack of evidence of the occurrence of mild "missed" cases in numbers actually exceeding reported cases leads us to the conclusion that convalescent serum is effective in the treatment of preparalytic poliomyelitis.

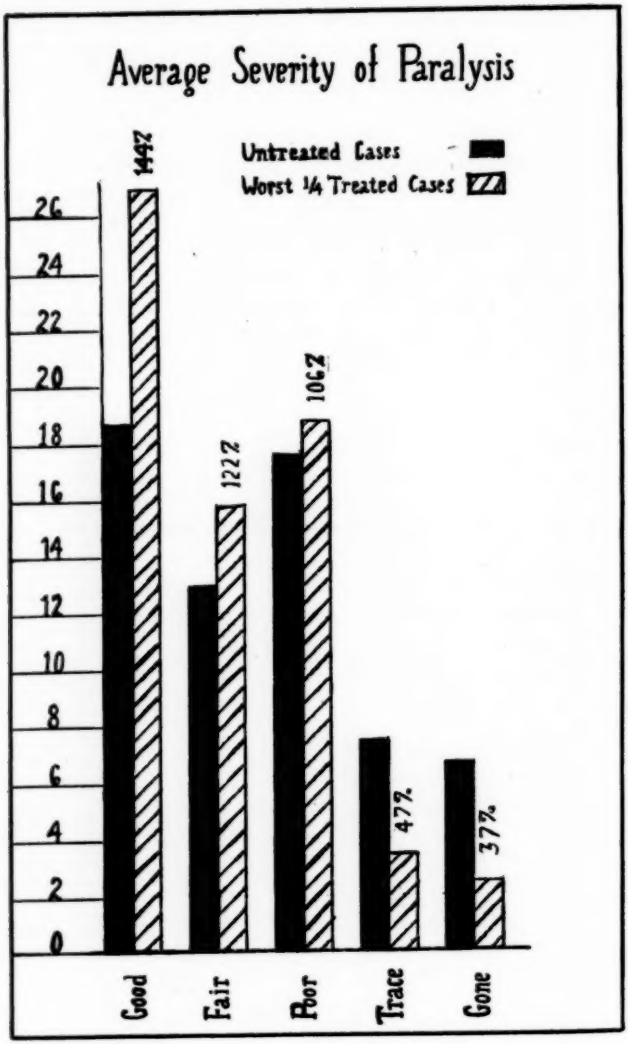
Average Severity of Paralysis
Untreated Cases
Worst ¼ Treated Cases
26
24
22
20
18
16
14
12
10
8
6
4
2
0
1497
1222
1062
477
377
Good
Fair
Poor
Trace
Gone

CHART III.

IN MEMORIAM: DR. HERMAN G. KLOTZ[1]

HENRY H. MORTON

In the days before cystoscopy and prostatic and kidney surgery had brought about the development of modern urology into a distinct specialty, the universal practice was the combination of skin and venereal diseases, and the death of Doctor Herman G. Klotz marks the passing of perhaps the last of the well-known dermato-urologists of the former generation. Dr. Klotz was born in a small town of Saxony in 1844; studied medicine at Wurzburg and Heidelberg and graduated from Leipzig in 1864. In the war of '66 between Prussia and Austria, he received a decoration from the King of Bavaria (the Bavarian War Cross) for services to the wounded.

His coming to America was a matter of accident, for while awaiting appointment in the Eppendorfer Krankenhaus he took a trip to New York as ship's surgeon on a steamer of the Hamburg-American Line. When the Franco-Prussian war broke out his ship was interned, and he took a position as resident physician in the German Hospital (now Lenox Hill). After leaving the German Hospital, he married Miss Marie C. Schwedler, daughter of his former chief, Dr. Schwedler.

In the course of his professional life he soon developed an interest in dermatology and urology, as these branches were then associated.

He was actively identified with the development of the German Hospital and Dispensary, and particularly interested in developing its medical library which was then housed in the old dispensary building on 2nd Avenue near 8th Street.

Dr. Klotz became naturalized soon after coming to the United States, and held steadily to his loyalty to this country during the World War, even though his allegiance cut him off from his father's relations in Germany during hostilities. He was a member of The New York Academy of Medicine, served on the Library Committee, and was

[1] Delivered before the Section of Medicine, October 16, 1928.

twice President of the New York Dermatological Society. At the time of his death he was among the oldest members of the latter society and had attended several meetings during the past year.

My personal recollections of Dr. Klotz are very vivid, and are connected with the two outstanding works of his life, namely, endoscopy and the injection of salicylate of mercury in the treatment of syphilis. I shall always remember the kindness and courtesy with which he showed me in his office at East 19th Street, how to use his endoscopic tubes illuminated by a light thrown in by a head mirror in cases of chronic urethritis. By this means the urethra could be plainly seen and local lesions such as erosions, open crypts and polypi diagnosed and treated. With the careful and painstaking attention to detail and with absolute honesty which were the striking features of his character, he described and classified completely the lesions as they were to be seen.

On a later occasion when the use of salicylate injections were being first brought to our attention, knowing his interest and experience in this form of treatment, I felt perfectly free to go to him in his clinic in 2nd Avenue, and he there gave me a demonstration of its application and a talk on the uses and dangers of the method.

With the advent of the small electric light bulbs, Dr. Klotz' endoscope with its less perfect illumination has been superseded, but the knowledge of the disease of the urethra which he had was superior to that which many of us possess to-day, even with our better illuminated instruments.

The personal contacts of which I have spoken and the history of his life, gives us the clue to his character; integrity, honesty and fearlessness in standing by his beliefs, united to a careful persistance and meticulous attention to detail, controlled always by strong common sense which showed in his clinical work and in his writing.

Such were the men who laid the foundations of the specialty of urology on which the present generation has built its modern superstructure.

THE INTERNATIONAL HOSPITAL CONGRESS

On August 29, 1928, on the invitation of Dr. René Sand, the chairman, and Dr. E. H. Lewinski-Corwin, the Secretary General of the committee, the Executive Committee of the International Hospital Congress met at the headquarters of the League of Red Cross Societies in Paris. Those present were representatives from twelve countries. Excuses were received from representatives of ten additional countries.

Resolutions

At the conclusion of the session, the following resolutions were unanimously adopted:

Time and Place

The Executive Committee endorsed the date fixed by the American Hospital Association for the meeting of the International Congress to be held at Atlantic City on Thursday, June 13, Friday, June 14, and Saturday, June 15, 1929, and accepted the invitation for the members of the Congress to attend the annual session of the American Hospital Association beginning Monday, June 17.

The International Hospital Congress will be open to hospital administrators, physicians and surgeons, nurses, architects, engineers and others interested in hospital questions, in accordance with the practice of the American Hospital Association.

Sessions

The Congress will hold six sessions devoted respectively to the following subjects:

June 13, *Morning Session*

Short Address of Welcome—Vote on Organization and By-laws—Election of Officers—Address on "Essential Hospital Functions."

June 13, *Afternoon Session*

Discussion of Hospital Planning in Relation to Economy and Efficiency.

June 14, *Morning Session*

Discussion of the Problem of Hospital Economics.

June 14, *Afternoon Session*

Discussion of the Respective Fields of Public and Private Hospital Work.

June 15, *Morning Session*

Discussion of Questions Relating to Psychopathic Hospitals and Hospitals for the Chronically Afflicted.

June 15, *Afternoon Session*

Discussion of the subject of an International Hospital Association and the creation of an International Hospital Bureau—Consideration of any action necessary—Arrangements for the Second International Hospital Congress—Closing Address.

Contributions by foreign delegates on other subjects will, insofar as circumstances permit, be presented at the annual session of the American Hospital Association.

Papers

The principal papers on the subjects enumerated above will be printed in full and circulated in advance in English, French and German, the authors being requested to send their contributions to the Secretary General not later than February 1, 1929.

Issue of Official Invitations

The Chairman and Secretary General of the International Executive Committee are authorized and requested to send official invitations to the various governments through the intermediary of the Secretary of State in Washington, forwarding at the same time a questionnaire on the hospital situation and hospital statistics in each country.

Scientific Exhibit

The American Hospital Association was invited to prepare a general scheme for the Scientific Exhibition to be held from June 13 to June 22 in connection with the International Congress and the annual session of the American Hospital Association. Each National Section will be organized under the responsibility of its respective National Committee, which will undertake to show, by means of diagrams, the general organization of the hospital system, the number of beds, the cost of maintenance, and new

developments in the field of hospital construction, equipment and management. Each National Section will be assigned a portion of the available space to be determined by the American Hospital Association. The costs of transportation, insurance during transport, and arrangement of the exhibits will be borne by the respective National Committees, the use of the space being free.

Commercial Exhibit

The same rules apply to commercial exhibits, each National Committee to get in touch with the leading commercial organizations existing in their respective countries, and to assume responsibility of accepting or refusing any kinds of goods, the principle being, however, that the exhibition aims at showing important industrial progress accomplished in the field of hospital equipment and supplies. It is requested to keep the charge for space in the Commercial Exhibition as low as possible, and that arrangements be made for bonding the exhibits.

Visits to American Hospitals

The plan entertained by the American Hospital Association to organize a tour in order that the official delegates may have an opportunity to visit the hospitals of New York, Philadelphia, Baltimore, and elsewhere has been gratefully accepted, with the recommendation that the tour begin in New York on June 5 and end in Atlantic City on June 12.

Every member is entitled to speak in whatever language he chooses.

Abridged translations will be made whenever possible in as many languages as appear necessary. The reports and proceedings will be published in English, French and German.

The Congress shall not formulate resolutions relating to technical subjects.

It was suggested that Sir Berkeley Moynihan, president of the British Association of Surgeons, be invited to de-

liver the inaugural address on the Essential Hospital Functions. It was voted to request Dr. S. S. Goldwater, for the paper on Hospital Planning, and to ask Pro. Grober for the paper on Hospital Economics. A Dutch speaker to present the report on Public and Private Hospitals, a Danish speaker the report on Psychopathic Hospitals, Prof. Tandler (Vienna) the report on Chronic Hospitals, M. Brizon (Lyon) the report on National Associations and the creation of an International Association. The questions of training of personnel and of hospital statistics should be left for the second Congress, or to be dealt with at the Annual Session of the American Hospital Association.

After discussion, the report and recommendations were all approved.

Dr. Wirth (Frankfurt) reported for the sub-Committee, laying a complete text before the committee, suggesting the appointment of a Treasurer General, and proposing that the present Executive Committee should remain active until the opening of the Congress. The report was approved, the selection of the Treasurer General being left to the Committee on International Hospital Relations of the American Hospital Association.

Dr. Elsass (Berlin) reported for the sub-Committee on Exhibition and Publicity.

In the discussion of the report it was suggested that not only general hospitals, but special hospitals, including psychopathic institutions, should be admitted to take part in the Scientific Exhibition.

The chairman explained that the whole work of preparation had been done in America and admirably conducted by Dr. Lewinski-Corwin and Dr. Goldwater. He voiced his feelings of gratitude to the members of the Committee, who had so promptly and wisely dealt with the questions submitted to them.

On the kind invitation of M. Chennevier, the members of the Committee visited various establishments of the

Assistance Publique de la Ville de Paris. They also visited the American Hospital at Neuilly.

R. SAND, *Chairman.*

ANNUAL REPORT OF THE HOSPITAL INFORMATION AND SERVICE BUREAU OF THE UNITED HOSPITAL FUND

SERVICE BUREAU

After five years of existence, the position as well as the character of the work of the Hospital Information and Service Bureau has been definitely established.

The following figures do not portray the character of the work; they do, however, give a certain idea of the expansion of the informational and assistive services rendered by the Bureau:

Year	*Requests for Information or Advice*
1923	944
1924	1,087
1925	1,454
1926	1,715
1927	2,013

It is impossible in this necessarily brief report to describe or even to list completely the multifarious activities of the Bureau. The present summary is, therefore, limited to the statement of certain activities and to the mention of several problems of importance to the hospital field of New York City.

DIRECTORIES OF HOSPITALS AND CONVALESCENT HOMES

At the invitation of the Welfare Council of New York, the Bureau undertook to prepare the Sections on Hospitals and Convalescent Homes for the Directory of Social Agencies published by the Charity Organization Society. These sections appear as separate entities and have been issued separately as reprints for distribution among the social service agencies.

Statistical Service

The Bureau collates annually the data published in the annual reports of hospitals. It also helps to prepare the statistical sheet of the United Hospital Fund which is of recognized value to the hospitals of the City as well as elsewhere. In addition, the Bureau makes certain up-to-date graphic charts of pertinent statistical facts, such as the bed capacity in general and special hospitals, the contributions of pay patients, the number of employees in various hospitals, the cost of food and the like. These charts are annually exhibited at the meetings of the American Hospital Association, and constitute the exhibit of the United Hospital Fund. The data secured and compiled by the Bureau serve as a basis for frequent educational releases to the daily press.

The tabulation of stillbirths and maternal deaths has been continued with the coöperation of a group of eminent obstetricians who have been meeting regularly every month.

Surveys of Hospitals

Acting as an agent of the American Medical Association and the American College of Surgeons, the Bureau staff surveyed a considerable number of hospitals and private sanatoria.

It may be of interest to mention the fact that the growth of proprietary hospitals has been considerable during the past year. The Bureau has compiled a list of over 100 such institutions within the limits of the Greater City.

Convalescent Service

It is the primary aim of the Convalescence Service Department of the Bureau to promote high standards of care, and to bring about an increased utilization of the existing facilities. The monthly statistical tabulations and the frequent conferences and discussions arranged by the Advisory Committee gradually lead to a better realization of the existing needs and deficiencies. In order to stimulate

better utilization of all available opportunities, the Bureau informs the Social Service Departments of the hospitals of vacancies in convalescent homes. There is likewise a record kept of the sources of reference to convalescent homes which throws valuable light on the situation. During the past year 50 per cent. of the patients in convalescent homes came from the out-patient departments, 35 per cent. were recruited from hospitals, 3 per cent. from unattached clinics, 8 per cent. from miscellaneous sources and only 4 per cent. were referred by private physicians. In order to bring the matter of existing facilities to the attention of the medical profession, a notice was inserted in the local medical press offering the facilities of the Bureau for placing the appropriate types of patients in convalescent homes. A summary of the work was published by the Chairman of the Advisory Committee in the April, 1928, issue of the Bulletin of The New York Academy of Medicine.

The Bureau has been requested by several homes, which do not maintain admission offices in the City, to act as the placement agency in the City. This work has been undertaken for seven homes, and in so far as the child patients are concerned, the Bureau functions in close coöperation with the Children's Welfare Federation.

During the past year study was made of the available facilities for the treatment of children with chorea.

The Special Advisory Committee on Convalescence meets monthly and discusses all the problems that come up before the Bureau and reviews the work in this field. The same Committee acts as the Executive Committee of the Section on Convalescence of the Welfare Council.

Employment Reference Service

The high labor turnover in hospital service, particularly in the lower grades of it, is a matter of concern to many of the hospital administrators. Following a survey of the situation made by the Committee on Help in Hospitals of the Tuberculosis Sanatorium Conference of Metropolitan

New York, the United Hospital Fund was requested to aid in setting up an employment reference service as well as an employment exchange as a part of the work of the Bureau.

The matter was considered at length and it was finally decided by the Executive Committee of the United Hospital Fund that such a service does not come within the functions of the Fund.

Educational Activities

The members of the staff are frequently called upon to give lectures or to participate in conferences on the various phases of hospital, out-patient and convalescent work or organization. They are also called upon to contribute papers or discussions to professional magazines.

Expressions of endorsement of this activity of the Bureau have been received. An eminent leader in the public health field wrote recently in part: "You are certainly performing a splendid service in the development of standard practice in connection with hospital and dispensary administration."

Collection of Hospital Plans

The Rockefeller Foundation has made the Bureau the custodian of over 800 hospital and medical school plans which it has collected during the years of its interest in the promotion of medical education and hospital projects. This valuable collection of plans and blue-prints constitutes the nucleus of a collection which probably is unrivalled in the variety of architectural design and type of hospital service.

Ambulance Service

The Bureau has been in touch with the Ambulance Board and has followed the development of the ambulance service in the city. During the past year certain features of it were brought to the attention of the Bureau by the Committee on Public Health Relations of

The New York Academy of Medicine. In the report submitted, the Committee expressed the belief that eventually all ambulance service will have to be carried on by the municipality. It pointed out that in the long distance hauls of ambulance patients no hazard to life is involved, with the exception of cases of acute hemorrhage, wounds of the abdomen and conditions requiring tracheotomy, and called attention to the fact that many people when injured in the streets, or otherwise, are taken in taxicabs to nearby hospitals with the result that hospitals do not lack experience in traumatic surgery irrespective of whether or not the hospital maintains a public ambulance.

Domiciliary Distribution of Hospital Patients

In connection with surveys which the Bureau is called upon to make, particularly when the question of enlargment of a hospital or removal to another location is concerned, studies are made of the domiciliary distribution of patients of the hospital concerned. An analysis of the available data indicates that a general hospital serves as a neighborhood institution only in so far as the wards are concerned, and even there this is more true of part pay and free patients than it is of the full pay ward patients. With regard to private or semi-private patients, the tapping area of the hospital depends entirely upon the dispersion of the clientele of the visiting staff.

Hospital Peak Load

The question has been raised whether the hospital facilities of New York City are sufficient to meet the demands at the season of the year when there is the highest prevalence of disease. Inquiry was made of twenty-six general hospitals with regard to the months of heaviest demand. March was the month of heaviest demand in ten of the twenty-six hospitals; May in five. In two hospitals January is the heaviest month of the year; in three April; in two June; in two October; in one December and in one August. It is surprising that in some instances the months of June, August and October are the months of highest utilization.

A further inquiry was made as to whether on the day of the largest utilization in the heaviest month of the year the demand was taxing the entire available capacity. There were three hospitals in the group on this particular day where there were no beds available. In the remainder of the hospitals, there was a fair margin of unoccupied beds.

This finding seems to indicate that, barring unexpected emergencies, the hospital facilities of the city are equal to the normal demand—even at the heaviest periods of the year.

Advisory Committee of Superintendents

Under the chairmanship of the Rev. Mr. George F. Clover of St. Luke's Hospital, a committee of hospital superintendents has met at frequent intervals during the year and discussed problems of importance coming before the Bureau. The judgment of experienced hospital administrators has been found to be of inestimable value. At a dinner given by Dr. George David Stewart, Chairman of the Bureau Committee, the general policies and methods of the work of the Bureau were discussed at length.

International Relations

At the suggestion of the Director of the Bureau, the idea of an international hospital conference has been promoted by the American Hospital Association. At a meeting of hospital representatives of nineteen countries which met in Paris on September 19, 1927, the Director of the Bureau was elected Secretary of the International Executive Committee and has been actively engaged in the organization of an international hospital conference which will take place in the United States in the spring of 1929. This will be the first conference of its kind on record.

New Hospital Facilities

The Bureau endeavors to keep an account of the new projects as well as of the progress of new construction in the hospital and convalescent fields. During the past

year, hospitals have dominated the institutional building field even more than usual. Important units of the new Columbia Presbyterian Medical Centre have now been completed and the Presbyterian Hospital opened its doors to the public in April. The following additional items are presented here for brief review:

New Buildings Completed

(Total Cost Over $16,000,000)

St. Luke's Hospital—addition to the private pavilion
St. Mark's Hospital
Beth Israel Hospital
Sydenham Hospital
St. Elizabeth's Hospital
West Side Hospital and Dispensary
Bronx General Hospital
Bellevue Hospital—Pavilion F for tuberculosis patients; pavilion G for neurological patients.

Ground Broken or Building Operations in Progress

(Over $28,000)

French Hospital
New Medical Centre—Babies Hospital; Neurological Institute
Bronx Hospital
Home for Incurables—Barker Memorial Building
Lutheran Hospital (Brooklyn)
St. John's Hospital (Brooklyn)
Mary Immaculate Hospital
Bellevue Hospital Out-patient Building
Rockefeller Institute—a building to house library and dining room.

Alterations

Bellevue Hospital—new southern wing and garage
Community Hospital—Clinic quarters
Memorial Hospital—purchase of two neighboring houses
Metropolitan Hospital—conversion of the 88th Street Police Station into a clinic and dispensary
New York Polyclinic Hospital—purchase of a neighboring dwelling and conversion of two floors of the present nurses' building for the use of patients.
New York Skin and Cancer Hospital—purchase of a neighboring house which has been utilized primarily for its large skin clinic.

Convalescent Home

St. Luke's Hospital—The Trustees have opened a new home. This welcome addition to the field has increased the existing facilities quantitively as well as qualitatively.

Projected New Developments

New York Hospital jointly with the Medical School of Cornell University have acquired the property on the East River at 68th Street where a new medical centre will be built.

New York Skin and Cancer Hospital has purchased the plot between 106th and 107th Streets on Fifth Avenue facing Central Park and will build a modern hospital there in the near future.

Impending campaigns for building funds are those for the Lebanon Hospital ($2,500,000).

Methodist Episcopal Hospital ($4,000,000).

Lenox Hill Hospital ($5,000,000).

Gifts and Bequests

Gifts in money made to Hospitals for various purposes during the year amounted to $1,850,000 including the following:

$300,000 to the Memorial Hospital by Mr. John D. Rockefeller, Jr.

$250,000 to the Memorial Hospital for radium by Mr. Edward S. Harkness.

$200,000 to the Neurological Institute for research work in encephalitis lethargica.

$9,193,498 in bequests went to member hospitals of the United Hospital Fund. The largest share went to St. Luke's Hospital. Mt. Sinai Hospital received thirteen bequests.

New Nurses' Homes

Mount Sinai Hospital

Bellevue Hospital—two new wings, including swimming pool and gymnasium

Memorial Hospital—five-story home

Montefiore Hospital—110 beds added to home

Brownsville and East New York Hospital

Staten Island Hospital

New Medical Centre--

a. Presbyterian Hospital

b. Neurological Institute

St. John's Hospital

Lincoln Hospital—taken over by the city two years ago.

MUNICIPAL HOSPITALS

Among the matters to receive widespread public attention is the proposed consolidation in one department of the municipal hospitals comprising about 40 per cent. of the hospital beds of the City. The municipal hospitals have been under the jurisdiction of three departments, namely, the Department of Public Welfare, Bellevue and Allied Hospitals and the Department of Health.

The above activities, necessarily reported briefly, summarily indicate that the Hospital Information and Service Bureau of the United Hospital Fund is rendering increasingly varied and valuable service to the hospitals of the community and to the public at large.

RECENT ACCESSIONS TO THE LIBRARY

American (The) text-book of prosthetic dentistry. 5. ed. Ed. by C. R. Turner & L. P. Anthony.
Phil., Lea, 1928. 772 p.

Antognetti, L. & Muggia, A. Le albuminurie benigne.
Milano, Soc. an istituto edit. scien., 1929 [1928]. 289 p.

Barnhill, J. F. The nose, throat and ear.
N. Y., Appleton, 1928. 604 p.

Bogert, L. J. Fundamentals of chemistry.
2. ed. Phil., Saunders, 1928. 345 p.

Braun, A. Sinus thrombophlebitis.
N. Y., Hoeber, [1928]. 269 p.

Brown, A. S. [et al.] The physician throughout the ages. v. 1.
N. Y., Capehart-Brown, 1928. 848 p.

Clark, W. M. The determination of hydrogen ions.
3. ed. Balt., Williams, 1928. 717 p.

Dennie, C. C. Syphilis; acquired and heredosyphilis.
N. Y., Harper, 1928. 304 p.

Foote, J. S. Bone as a measure of development.
Omaha, Douglas, 1928. 182 p.

Freudenthal, P. Experimental rickets.
Copenhagen, Levin, 1927. 235 p.

Gesell, A. Infancy and human growth.
N. Y., Macmillan, 1928. 418 p.

Goodman, H. Story of electricity and a chronology of electricity and electro-therapeutics.
N. Y., Medical Life Press 1928. 62 p.

Harrow, B. Glands in health and disease.
[2. ed.] N. Y., Dutton, [1928]. 275 p.

Hollander, B. Methods and uses of hypnosis & self-hypnosis.
N. Y., Macmillan, [1928]. 191 p.

Imre, J. Lidplastik und plastische Operationen anderer Weichteile des Gesichts.
Budapest, "Studium" verlag, [1928]. 95 p.

Jones, F. W. & Porteus, S. D. The matrix of the mind.
Honolulu, Univ. of Hawaii, 1928. 457 p.

Leibovici, R. Etude chirurgicale des gangrènes juvéniles par artérites chroniques non syphilitiques.
Paris, Doin, 1928. 231 p.

Lennox, W. G. & Cobb, S. Epilepsy.
Balt., Williams, 1928. 197 p.

New York tuberculosis and health association. Criteria for the classification & diagnosis of heart disease.
N. Y., Hoeber, 1928. 92 p.

Ogilvie, W. H. Recent advances in surgery.
Phil., Blakiston, 1928. 461 p.

Orban, B. Dental histology and embryology.
Chic., Rogers, [1928]. 223 p.

Orrin, H. C. Fascial grafting in principle and practice.
Edinb., Oliver, 1928. 92 p.

Pearson, W. J. & Wyllie, W. G. Recent advances in diseases of children.
Lond., Churchill, 1928. 593 p.

Policard, A. Précis d'histologie physiologique.
2. ed. Paris, Doin, 1928. 923 p.

Posner, J. J. Minor oral surgery.
Phil., Patterson, 1928. 106 p.

Ramadier, J. La syphilis auriculaire; oreille et nerf acoustique.
Paris, Doin, 1928. 173 p.

Rassenfosse, A. & Gueben, G. Des alchimistes aux briseurs d'atomes.
Paris, Doin, 1928. 184 p.

Retterer, E. Evolution du testicule et du pancréas après la greffe ou la résection des conduits excréteurs.
Paris, Doin, 1928. 119 p.

Rutherford, C. W. The eye.
N. Y., Appleton, 1928. 404 p.

Schultzer, P. Lyset og experimentel rachitis.
Copenhagen, Levin, 1927. 217 p.

Transactions of the annual meeting of the American bronchoscopic society. 1927.

Transactions of the College of physicians of Philadelphia. 1927.

Veil, P. & Codina-Altés, J. Traité d'électrocardiographie clinique.
Paris, Gaston, 1928. 447 p.

Voronoff, S. The conquest of life.
N. Y., Brentano, 1928. 200 p.

White, W. A. Lectures in psychiatry.
N. Y., Nervous and mental dis. pub. co., 1928. 167 p.

Willis, H. S. Laboratory diagnosis and experimental methods in tuberculosis.
Springfield, Ill., Thomas, 1928. 330 p.

PROCEEDINGS OF ACADEMY MEETINGS

OCTOBER

Special Meeting

Monday Evening, October 1, at 8:30 o'clock

I. Address

The doctor—trainer or healer, George E. Vincent, President, Rockefeller Foundation

II. The Wesley M. Carpenter Lecture

The pathology of the aging process, Aldred S. Warthin, Professor of Pathology, University of Michigan

Stated Meeting

Thursday Evening, October 4, at 8:30 o'clock

ORDER

I. Executive Session

Election of Fellows

II. Papers of the Evening

a. The pains, penalties and prohibitions of old age, Sir Farquhar Buzzard, Professor of Medicine, Oxford (by invitation)

b. Menopausal and post-menopausal conditions in women, Benjamin P. Watson

c. The relation of disorders of ductless glands to senescence, William Engelbach, St. Louis (by invitation)

Special Notice

There will be no Stated Meeting of the Academy on October 18.

The next Stated Meeting will be that of November 1. The program will appear in the first November folder.

Section Meetings

Section of Dermatology and Syphilis

Wednesday Evening, October 3, at 7:45 o'clock

ORDER

I. Presentation of Patients

Miscellaneous cases from various clinics

II. Discussion

III. Executive Session

Examination of cases is limited to members and their invited guests.

Attention is called to the change of date and hour of meeting.

The November meeting of the Section will be held on Wednesday, November 7, instead of Tuesday, November 6, as scheduled.

Section of Surgery

Friday Evening, October 5, at 8:30 o'clock

ORDER

I. Papers of the Evening

a. Osteomalacia and Paget's disease, Edwin Allen Locke, Harvard University (by invitation)

b. Traumatic surgery and the problems of old age, John J. Moorhead

c. The conditions of the rectum in old age, Jerome M. Lynch (by invitation)

II. Executive Session

Section of Neurology and Psychiatry

Tuesday Evening, October 9, at 8:30 o'clock

ORDER

I. Papers of the Evening

a. The aging of the human brain, Frederick Tilney

b. Apoplexy, Bernard Sachs

II. Executive Session

The Harvey Society

(Affiliated with The New York Academy of Medicine)

1928-1929

The first lecture of the series will be given by

Professor C. W. Child

University of Chicago

on

"Senescence and Rejuvenescence From a Biological Standpoint"

Thursday Evening, October 11, at 8:30 o'clock

Section of Pediatrics

Saturday Evening, October 13, at 8:30 o'clock

Combined Meeting

New England Pediatric Society and Philadelphia Pediatric Society at Philadelphia

Section of Ophthalmology

Monday Evening, October 15, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Clinical Cases

III. Papers of the Evening

a. Relations between posterior accessory sinuses and affections of the optic nerve, Georges Weill, Professor of Ophthalmology, University of Strasbourg (by invitation)

b. The role of the "Three T's" and the "Reform Diet" in ophthalmology, George Huston Bell

Discussion

Louis Fargeres Bishop, James J. King, James G. Dwyer, Robert H. Rose (by invitation), Philip N. Norman (by invitation), Ray R. Losey

IV. Executive Session

SECTION OF MEDICINE

Tuesday Evening, October 16, at 8:30 o'clock

ORDER

I. PAPERS OF THE EVENING
   a. Serum protection and serum treatment of poliomyelitis, Simon Flexner
   b. Diagnosis and treatment of preparalytic poliomyelitis, William L. Aycock, Director, Poliomyelitis Research, Vermont Department Public Health (by invitation)

II. DISCUSSION OPENED BY:
   George Draper, Shirley Wynne

SECTION OF GENITO-URINARY SURGERY

Wednesday Evening, October 17, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. PRESENTATION OF CASES
   a. 1. Xanthin renal calculus
      2. Congenital hypoplasia of kidney—uremia
      3. An examining table for cystoscopic and x-ray procedures, Paul W. Aschner
   b. Interesting seminal vesiculograms, Joseph F. McCarthy, J. Sidney Ritter

III. A MEMORIAL ADDRESS: HERMAN G. KLOTZ, Henry H. Morton

IV. PAPER OF THE EVENING
   Surgery of the prostate, Oswald S. Lowsley
   DISCUSSION BY
   Benjamin S. Barringer, Edwin Beer, Henry G. Bugbee, Nathaniel P. Rathbun, A. Raymond Stevens, Alfred T. Osgood

SECTION OF ORTHOPEDIC SURGERY

Friday Evening, October 19, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. PRESENTATION OF CASES
   a. Congenital dislocation of the hip (lantern slides and motion pictures), Arthur Krida
   b. Congenital dislocation of hip, George Anapol (by invitation)

III. PAPER OF THE EVENING
   Congenital dislocation of the hip (lantern slides and motion pictures), Arthur Krida

IV. DISCUSSION
   Fred H. Albee, Samuel W. Boorstein, Russell A. Hibbs, Royal Whitman

V. GENERAL DISCUSSION

Section of Otology

Friday Evening, October 19, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Presentation of Cases

a. Chronic mastoiditis and labyrinthitis, following gunshot wound of the ear; operation, recovery

b. Cerebellar abscess, sinus thrombosis; operation, recovery, John McCoy

III. Paper of the Evening

Pathology of the ear in meningitis (illustrated by lantern slides), S. J. Crowe, Johns Hopkins Hospital (by invitation)

Discussion opened by Wells P. Eagleton, Edward B. Dench

IV. General Discussion

V. Executive Session

Section of Obstetrics and Gynecology

Tuesday Evening, October 23, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Presentation of Cases

a. Abdominal lithopedion, Sophia Kleegman (by invitation)
Discussion by Frederick C. Holden

b. Rectal implantation of ureters for inoperable vesico-vaginal fistula, Henry Dawson Furniss
Discussion by Edwin Beer, Edward L. Keyes, Herman Lorber (by invitation)

III. Papers of the Evening

a. Acute appendicitis and acute initial salpingitis: A differential point, James V. Ricci (by invitation)
Discussion by Edward W. Pinkham

b. The mechanism of labor, Abraham J. Rongy
Discussion by George L. Brodhead, Everett M. Hawks, Edward C. Lyon, Jr.

IV. General Discussion

V. Executive Session

Section of Laryngology and Rhinology

Wednesday Evening, October 24, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Presentation of Patients

a. Carcinoma of orbit and ethmoid removed by surgical diathermy, Mervin C. Myerson

b. Case for diagnosis, Francis W. White

III. Presentation of Instruments
   a. New type of needle for intro-nasal suturing, John M. Loré
   b. An improved method in bronchoscopic lighting applied to Jackson type of instruments, C. J. Imperatori

IV. Paper of the Evening
   The prevention of nasal deformities following submucous resection of the nasal septum, W. W. Carter
   Discussion, Lee M. Hurd, Wesley C. Bowers, Francis W. White

V. General Discussion

VI. Executive Session

Section of Historical and Cultural Medicine

Friday Evening, October 26, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Papers of the Evening
   a. Three curious Vermont epitaphs, Harris A. Houghton
   b. Brief sketch of Valentine Mott, Louis F. Bishop, Jr. (by invitation)
   c. Medicine men of the American Indian, Harlow Brooks

NOTES

Fellows Elected October 4, 1928

Cyril Barnet ..... 346 West End Avenue
Sprague Carleton ..... 121 East 60th Street
Eugene Seeley Coler ..... 1088 Park Avenue
Clarence Ewald de La Chapelle ..... 900 West End Avenue
Daniel Joseph Donovan ..... 790 Riverside Drive
John Duff ..... 34 Gramercy Park
Lew Henri Finch ..... 188 Market Street, Amsterdam, N. Y.
George Winthrop Fish ..... 8 East 68th Street
William Goldring ..... 150 East 52nd Street
Le Grand Haven Hardy ..... 30 East 40th Street
Edward Hoenig ..... 530 West 142nd Street
Edward Hicks Hume ..... 303 East 20th Street
Raphael Kurzrok ..... 1555 Grand Concourse
Charles Lerner ..... 5 East 53rd Street
Walter Gay Lough ..... 485 Park Avenue
Gervais Ward McAuliffe ..... 110 West 55th Street
Sigmund Mage ..... 670 West End Avenue
M. Joseph Mandelbaum ..... 125 West 72nd Street
Angelos E. Marcoglou ..... 125 West 72nd Street
Orman Clarence Perkins ..... 10 Schermerhorn Street, Brooklyn

Elias Alfred Reed.....United States Customhouse, Bowling Green,
John Ross.....33 East 68th Street
Rudolph Nicholas Schullinger.....51 East 50th Street
Willis Morris Weeden.....70 East 77th Street
Carnes Weeks.....168 East 71st Street
John Franklyn White.....156 North Main Street, Port Chester, N. Y.

AND TO ASSOCIATE FELLOWSHIP:

Clairette Papin Armstrong, B.A.....114 East 71st Street
Nicholas Kopeloff, Ph.D.....Psychiatric Institute, Ward's Island, N. Y.
Harry Beal Torrey, Ph.D.....Edgehill Inn., Spuyten Duyvill

Correction

The obituary of Dr. Robert Abbe, in Volume IV, p. 583, signed by Dr. Charles L. Dana, is not by Dr. Dana. His signature should follow the obituary on p. 584.

Donations to the Library Funds

Donations and bequests are solicited by The New York Academy of Medicine for the maintenance and expansion of the Library.

A donation or bequest of $5,000 or more will provide for a special library fund, the income of which may be used for the general purposes of the Library or restricted to the purchase of books and periodicals, as the donor or testator may indicate.

Announcement

A simple luncheon is now being served on the sixth floor to the Academy staff.

The House Committee has agreed to have luncheons served in the reception room to Fellows of the Academy. Any Fellow desiring luncheon should notify the Academy telephone operator not later than 11 A. M.

Dates of Academy Meetings

STATED MEETINGS

1st and 3rd Thursdays.

SECTION MEETINGS

Dermatology and Syphilis, 1st Tuesday.
Surgery, 1st Friday.
Neurology and Psychiatry, 2nd Tuesday.
Pediatrics, 2nd Thursday.
Otology, 2nd Friday.
Ophthalmology, 3rd Monday.
Medicine, 3rd Tuesday.
Genito-Urinary Surgery, 3rd Wednesday.
Orthopedic Surgery, 3rd Friday.
Obstetrics and Gynecology, 4th Tuesday.
Laryngology and Rhinology, 4th Wednesday.
Historical and Cultural Medicine, 4th Friday of October, December, February and April.

TRUSTEES, COUNCIL AND COMMITTEE MEETINGS

Trustees, 4th Wednesday
Council, 4th Wednesday.
Committee on Admission, 1st Wednesday.
Committee on Library, 2nd Tuesday.
Public Health Relations Committee, Mondays.
Committee on Medical Education, 2nd Thursday.
Committee on International Medical Relations, 3rd Wednesday.

DEATHS OF FELLOWS OF THE ACADEMY

William Nathaniel Berkeley, M. D., 210 East 60th Street, New York City; graduated in medicine from the University of Virginia, Charlottesville, in 1891, and Bellevue Medical College, New York City, in 1896; elected a Fellow of the Academy April 3, 1902. Dr. Berkeley was a member of the Pathological Society; he died, October 23, 1928.

Donald Muhlenberg Cammann, M.D., 1 West 54th Street, New York City; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1879; elected a Fellow of the Academy April 5, 1888; died, October 13, 1928.

William Frank Greene, M.D., 431 North Braddock Street, Winchester, Virginia; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1878; elected a Fellow of the Academy January 2, 1890; died, October 17, 1928.

OFFICERS OF SECTIONS, 1928-1929

DERMATOLOGY AND SYPHILIS, 1st Tuesday

Chairman	*Secretary*
Isadore Rosen	Ray H. Rulison
330 Park Avenue	145 East 54th Street

SURGERY, 1st Friday

Edward D. Truesdell	William Crawford White
114 East 54th Street	145 East 54th Street

NEUROLOGY AND PSYCHIATRY, 2nd Tuesday

Junius W. Stephenson	Moses Keschner
20 West 50th Street	32 West 82nd Street

PEDIATRICS, 2nd Thursday

Stafford McLean	Frank Elmer Johnson
17 East 71st Street	300 West End Avenue

OTOLOGY, 2nd Friday

Clarence H. Smith	James Garfield Dwyer
2 East 54th Street	57 West 57th Street

OPHTHALMOLOGY, 3rd Monday

Bernard Samuels	Thomas H. Johnson
57 West 57th Street	30 West 59th Street

MEDICINE, 3rd Tuesday

Ralph H. Boots	James Ralph Scott
791 Park Avenue	100 East 55th Street

GENITO-URINARY SURGERY, 3rd Wednesday

John Sturdivant Read	Archie L. Dean, Jr.
130 Clinton Street	30 East 40th Street
Brooklyn, N. Y.	

ORTHOPEDIC SURGERY, 3rd Friday

Elmer P. Weigel	Armitage Whitman
727 Watchung Avenue	71 Park Avenue
Plainfield, N. J.	

OBSTETRICS AND GYNECOLOGY, 4th Tuesday

Thomas H. Cherry	Edwin G. Langrock
45 East 51st Street	515 Park Avenue

LARYNGOLOGY AND RHINOLOGY, 4th Wednesday

David H. Jones	Edward Frankel, Jr.
114 East 54th Street	152 West 58th Street

HISTORICAL AND CULTURAL MEDICINE

4th Friday of October, December, February and April

Bernard Sachs	Charles E. Atwood
116 West 59th Street	40 East 54th Street

1928

COMMITTEES OF THE ACADEMY

Committee on Admission

GEORGE B. WALLACE, *Chairman*

ARTHUR W. WRIGHT
HOWARD F. SHATTUCK
ALEXIS V. MOSCHCOWITZ
DEWITT STETTEN
HARBECK HALSTED
ROLFE FLOYD
FRED P. SOLLEY
RICHARD T. ATKINS

Committee on Library

J. RAMSAY HUNT, *Chairman*
EUGENE F. DUBOIS
RUSSELL L. CECIL
ERNEST G. STILLMAN
ALFRED F. HESS

Committee on Public Health Relations

CHARLES L. DANA, *Chairman*

Executive Committee

ROBERT J. CARLISLE
JAMES B. CLEMENS
LEWIS F. FRISSELL
JOHN A. HARTWELL
CHARLES GORDON HEYD
JAMES ALEX. MILLER
BERNARD SACHS
FREDERIC E. SONDERN
GEO. DAVID STEWART
PHILIP VAN INGEN
GEORGE B. WALLACE
E. H. L. CORWIN
Executive Secretary

Committee on Medical Education

NELLIS B. FOSTER, *Chairman*

Executive Committee

HARLOW BROOKS
ARTHUR F. CHACE
HOWARD FOX
LUDWIG KAST
ARNOLD KNAPP
SAMUEL J. KOPETZKY
GEORGE W. KOSMAK
EMANUEL LIBMAN
JOSEPH F. MCCARTHY
JOHN J. MOORHEAD
GEORGE GRAY WARD
ORRIN SAGE WIGHTMAN
FREDERICK P. REYNOLDS,
Medical Secretary

GRACE CARSTENSEN, *Executive Secretary*

Committee on International Medical Relations

SAMUEL J. KOPETZKY, *Chairman*

Executive Committee

HENRY H. FORBES
I. W. HELD
LUDWIG KAST
EMANUEL LIBMAN
WENDELL C. PHILLIPS
EUGENE H. POOL
DE WITT STETTEN
FREDERICK P. REYNOLDS,
Secretary

House Committee

ARTHUR B. DUEL, *Chairman*
ROYAL S. HAYNES
GEORGE DAVID STEWART
WALTER L. NILES

Nominating Committee

J. BENTLEY SQUIER,
Chairman
W. W. HERRICK
FOSTER KENNEDY